The Efficacy of a Limited Mindfulness-based Intervention in Promoting Positive Student Mental Health

Nathan MacIsaac, B.A.

A thesis submitted in partial fulfillment of the Bachelor of Arts degree (Honours Psychology)

University of Prince Edward Island

April 2015

PERMISSION TO USE HONOURS PAPER

Title of paper: The Efficacy of a Limited Mindfulness-based Intervention in Promoting Positive Student Mental Health

Name of Author: Nathan Colin Macisaac

Department: Psychology

Degree: Bachelor of Arts, Honours Psychology

Year: 2015

Name of Supervisor(s): Dr. Nia Phillips

In presenting this paper in partial fulfillment of the requirements for an honours degree from the University of Prince Edward Island, I agree that the Libraries of this University may make it freely available for inspection and give permission to add an electronic version of the honours paper to the Digital Repository at the University of Prince Edward Island. I further agree that permission for extensive copying of this paper for scholarly purposes may be granted by the professors who supervised my work, or, in their absence, by the Chair of the Department or the Dean of the Faculty in which my paper was done. It is understood any copying or publication or use of this paper or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of Prince Edward Island in any scholarly use which may be made of any material in my paper.

CERTIFICATION

I certify that this thesis has not been submitted for any higher degree to any other University or Institute

Nathan MacIsaac

CERTIFICATE OF EXAMINATION

For an undergraduate honours thesis submitted by

Nathan Colin MacIsaac

Thesis Title:

The Efficacy of a Limited Mindfulness-based Intervention in

Promoting Positive Student Mental Health

Examination Committee

Jason Doiron, PhD
Associate Professor, Psychology

James Moran, Phd
Associate Professor, History

Thesis Supervisor & Committee Chair

Nia Phillips, PhD
Assistant Professor, Psychology

Is accepted in partial fulfillment of the undergraduate BA Honours degree
in the Department of Psychology at the University of Prince Edward Island

Contents

ACKNOWLEDGEMENTS

First and foremost I would like to thank my parents, Colin and Dawn MacIsaac, for supporting me in the journey towards my undergraduate degree. Without their support I do not know if I would have ever reached this point. In addition, thank you to Dr. Nia Phillips for not only accepting me as an honours student and supervising my project, but for also sparking my interest in the study of statistics, research design, and feminist psychology. Without Dr. Phillips support this project would not have been possible. Thanks are also in order for Dr. Catharine Ryan who has also played a significant role in shaping my outlook on the field of psychology over the years, especially when it comes to behavioural neuroscience. Furthermore, I must give thanks and acknowledgement to all of my psychology professors over the years for shaping me into the student and person I am today. I also want to extend a sincere thank you to my friends, particularly Emma McIntosh, for listening to and making suggestions about my research project for the past year. Finally, I would like to express my gratitude to the members on my defence committee for their interest in my research project and for agreeing to sit on the defence panel.

Abstract

Mindfulness and mindfulness-based interventions (MBI) have become more popular over the last three decades, showing efficacy for a variety of physical and mental health issues. As a result, there is a potential for MBIs to be implemented across university campuses to address the growing demand placed on universities' mental health services. However, the problem with the average MBI is the time investment required, generally between 30-50 hours over 8 weeks. The present study attempted to produce a novel mindfulness-based intervention, which was less time and practice intensive, while still producing the outcomes seen in the average MBI. Students' were randomly assigned to either undergo the MBI or act as a wait-list control group. Both groups completed a series of pre- and post-intervention surveys measuring levels of mindfulness, self-compassion, decentring, affect, rumination, worry, depression, anxiety, and stress. Post-intervention levels for the treatment group across all measures were in the predicted direction and significantly different compared to the wait-list control group. The findings demonstrate the efficacy of a limited MBI in producing comparable outcomes to the average MBI. The present study adds to the small body of research on limited MBIs and suggests that a limited MBI has the potential to be adopted and implemented across campuses to promote positive student mental health.

List of Variables and Abbreviations

MBI = Mindfulness-based Intervention

CBT = Cognitive-Behavioural Therapy

DBT = Dialectical Behavioural Therapy

MBCT = Mindfulness-based Cognitive Behavioural Therapy

MBSR = Mindfulness-based Stress Reduction

SFM = Single-Field Meditation

OFM = Open-Field Meditation

LKM = Loving-Kindness Meditation

MM = Mindfulness Meditation

FFMQ = Five-Factor Mindfulness Questionnaire

MAAS = Mindful Attention Awareness Scale

FMI = Freiburg Mindfulness Inventory

KIMS = Kentucky Inventory of Mindfulness Skills

CAMS = Cognitive Affective Mindfulness Scale

MQ = Mindfulness Questionnaire

SCS = Self-Compassion Scale

SCS-SF = Self-Compassion Scale Short Form

PANAS-X = Positive and Negative Affect Scale Expanded

RRS = Ruminative Response Scale

PSWQ = Penn State Worry Questionnaire

DASS = Depression Anxiety and Stress Scale

LKM Total = Total Time Spent Practicing Loving-Kindness Meditation

The Efficacy of a Limited Mindfulness-based Intervention in Promoting Positive Student Mental Health

Western psychotherapy is currently in a transition from second-wave behaviourist therapies, such as Cognitive-Behavioural Therapy, which focus on changing the contents of thought, towards what Hayes (2004a) calls the third-wave of behaviourist therapy, which emphasizes the dialectic of acceptance and change. A common factor among these third wave behaviourist therapies is the inclusion of the Buddhist concept of mindfulness as a core component in the skills training clients receive. Thus, these psychotherapies may also be thought of as mindfulness-based interventions, or MBIs. The interventions that have received the most attention in this new wave of psychotherapy are: Mindfulness-based Stress Reduction (MBSR), Mindfulness-based Cognitive Therapy (MBCT), and Dialectical Behavioural Therapy (DBT). First, I will take a brief look at the origins of these therapies and their use of mindfulness. Then, I will review the status of mental health and students, what mindfulness and mindfulness meditation is and is not, and what researchers believe the mediators and mechanisms of change in mindfulness are. Furthermore, I will draw on empirical studies from MBIs to provide evidence for the therapeutic utility of mindfulness and mindfulness meditation. Finally, I will discuss the present study and its primary research question: will students report the positive benefits of mindfulness after undergoing a limited MBI rather than the intensive, manualized training commonly seen in MBIs?

In 1982, Jon Kabat-Zinn designed the 8-week MBSR program with the intention of helping patients reduce their subjective experiences of chronic pain using mindfulness meditation techniques, such as sitting meditation, as a way to enhance self-regulatory coping. Kabat-Zinn (1982) believed that the directed attention associated with mindfulness would help

patients, over time, learn a new association between the initial pain sensation and subsequent cognitive and affective appraisals. In other words, Kabat-Zinn was interested in teaching patients how to live with this condition using mindfulness meditation as a tool to bring about a change in self-regulation (Kabat-Zinn, Lipworth, & Burney 1985). Since then, the MBSR program has been used with a growing amount of clinical and non-clinical populations; however, the program itself has remained largely unchanged. Closely related to MBSR is MBCT, developed in 1995 by Teasdale, Segal, and Williams with the goal of incorporating both MBSR and traditional cognitive therapy to address the high rates of depressive relapse/recurrence seen in people diagnosed with major depression disorder. Teasdale et al. (1995) suggest that practicing mindfulness would increase a client's meta-cognitive insight into their own depressogenic cognitive patterns, thereby protecting against future depressive relapse/recurrence (for a general overview of MBCT, see: Sipe & Eisendrath, 2012).

Finally, in 1991, Dr. Marsha Linehan designed DBT, as an alternative to cognitive-behavioural therapy (CBT), for the treatment of borderline personality disorder (BPD). While DBT incorporates many features of CBT, DBT differs in that more emphasis is placed on changing the client's relationship to their thoughts rather than trying to change the actual thought content (for an overview of DBT see: Rizvi, Steffel, Carson-Wong, 2012). DBT has also started to see an expansion in the clinical populations using this treatment with encouraging preliminary findings (e.g., depression: Lynch, Morse, Mendelson, & Robins, 2003; Binge Eating Disorder: Telch, Agras, & Linehan, 2001). The particularly salient component of DBT is the focus on teaching clients mindfulness in order to cultivate conscious control over attentional process, achieve a "wise" integration of emotional and rational thinking, and experience a sense of

connectedness with all beings, including the self (Lynch, Chapman, Rosenthal, Kuo, & Linehan, 2006).

Students and Mental Health

In 2013, the Centre of Collegiate Mental Health (CCMH) released their annual report detailing the current status of mental health in college students using data from 132 college and university counselling centres describing more than 95,000 unique college students' experiences seeking treatment (Centre of Collegiate Mental Health, 2013). The CCMH (2013) reports during the 2012-2013 academic year lifetime prevalence for the following experiences by students (N=95,109): 48.7% of students had attended counselling for mental health concerns; 32.9% of students had taken medication for mental health concerns; 30.3% of students had seriously considered attempting suicide and 8.8% of students had attempted suicide; finally, 10.3% of students had been hospitalized for mental health concerns (pg. 15).

Similarly, the Association for University and College Counselling Centre Directors (AUCCCD), an international organization of counselling centre directors, released their annual report detailing mental health issues and trends on university campuses. The AUCCCD survey (2013) compiled data from 380 counselling centre directors (a 50% response rate) whose staff delivered close to 2 million clinical hours for nearly 350,000 students. The AUCCCD reports that anxiety remains to be the most pressing concern amongst college students and has increased from 41.6% in 2012 to 46.2% in 2013. The authors also report that the number of students seeking help for depression has increased to 39.3%, up nearly 3% since 2012. Finally, and perhaps most concerning, is that the percentage of students reporting concerns about suicidal ideation was 17.9%, up from 16.1% in 2012. However, this growth in students reporting

problems with anxiety, depression, and suicidal ideation is not new; in fact, these rates have been increasing since 1994 (Storrie, Ahern, & Tuckett, 2009).

With most mental health disorders having their first onset by young adulthood (Kessler, Berglund, Demler, Jin, Merikangas, & Walters, 2005) and with the number of Canadians attending post-secondary education on the rise (Association of Universities and Colleges of Canada, 2010), universities are in a unique position to prevent, detect, and treat mental health disorders among university students. Universities providing treatment options for students with mental health concerns is of utmost importance because these students have been shown to have lower engagement with campus activities, lower grade averages, and lower rates of graduation than students not suffering from mental health problems (Regehr, Glancy, and Pitts, 2013). Furthermore, research suggests that mental health disorders, such as affective disorders, are a risk factor for suicidal behaviour (Beautrais, 2000).

Clinical researchers now believe that depression and anxiety are best characterized as disorders of emotion regulation (Gross, 1998a; Gotlib & Joormann, 2010; Amstadter, 2008); for example, prolonged negative affect is a hallmark symptom of major depressive disorder and anxiety (Gotlib & Joormann, 2010; Amstadter, 2008). Gross (1998a) defines emotion regulation as "the processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions" (pg. 275). It is important to note that implicit in Gross' definition of emotion regulation is that it is a process of self-regulation.

At this point it is important to make a distinction between *affect, emotion,* and *mood*. *Affect* refers to the superordinate class for all valenced conditions (Amstadter, 2008; Gross, 1998a; Rottenberg & Gross, 2003). *Emotions* can best be understood as a subclass of affect, involving a flexible transient state elicited by internal or external stimuli that are deemed relevant to an

organism (Gross, 1998a). In addition, emotions are multi-dimensional, accompanied by cognitive, experiential, physiological, and behavioural response tendencies (Lang, 1994; Rottenberg & Gross, 2003). For example, sadness may elicit the following response tendencies: thoughts about the source of sadness (e.g., loss of pet), feelings of loss, increased heart rate, and crying. Conversely, *moods* are also multi-dimensional, but they are longer lasting, slower moving, and less tied to specific objects or elicitors (Amstadter, 2008; Rottenberg & Gross, 2003). Finally, Gross and John (2003) make the distinction between *antecedent-focused* and *response-focused* emotion regulation strategies. Antecedent-focused strategies (e.g., cognitive reappraisal) refer to things we do before the emotion response tendencies have been fully activated; whereas response-focused strategies (e.g., expressive suppression) refer to things we do once an emotion is already underway (pg. 348-349). Of course, these strategies can lead to either emotion regulation or dysregulation.

Thus, in theory, interventions designed to modulate the emotion response tendencies and/or strategies elicited by stimuli could be beneficial for the prevention and treatment of these disorders. In the case of depression and anxiety, researchers theorize that certain emotion regulation strategies such as rumination (Gotlib & Joormann, 2010; Nolen-Hoeksema, 2000; Nolen-Hoeksema, 1991; Rottenberg and Gross, 2003) and worry (Nolen-Hoeksema, Wisco, and Lyubomirsky, 2008) contribute to emotion dysregulation; moreover, both are believed to be a trans-diagnostic factor, or a mechanism responsible for the frequent comorbidity of depression and anxiety (McLaughlin & Nolen-Hoeksema, 2011). One key difference between rumination and worry is the temporal nature; the latter is future oriented, while the former is more past-/present-oriented (Nolen-Hoeksema et al., 2008). In other words, both rumination and worry can be conceptualized as antecedent-focused emotion regulation strategies. Therefore, interventions

designed to enhance emotion regulation could interrupt the emotional episode before it completely unfolds, thereby altering the trajectory of the episode (Rottenberg and Gross, 2003). In fact, Radkovsky, McArdle, Bockting, and Berking (2014), in a study assessing the use of emotion regulation skills in ameliorating depressive symptoms, found that two potentially adaptive emotion regulation skills for reducing depressive symptoms were the ability to tolerate negative emotions and to actively modify undesired emotions. Thus, in theory, because mindfulness emphasizes a present-oriented stance characterized by acceptance and non-judgment it should reduce a person's rumination and worry, thereby increasing their emotion regulation, and reducing subjective levels of negative emotions.

As a result, MBIs have received increasing amounts of attention as of late because of mindfulness' emotion regulation potential and broad range of applicability (Baer, 2003; Cullen, 2011; Davis and Kurzban, 2012; Hölzel, Lazar, Gard, Schuman-Olivier, Vago, and Ott, 2011; Lynch, Chapman, Rosenthal, Kuo, and Linehan, 2006). What is mindfulness? Bishop et al. (2004) propose a two-component operational definition of mindfulness: the first component involves self-regulation "of attention so that is maintained on immediate experience, thereby allowing for increased recognition of mental events in the present moment" (pg. 232); whereas the second component involves the "adaptation of a particular orientation to one's experiences in the present moment, an orientation characterized by curiosity, openness, and acceptance" (pg. 232). (This definition of mindfulness will be elaborated on in the section addressing mindfulness.)

With the increase in students facing immense amounts of stress in the form of mental health disorders, academic performance, and financial burdens (Flatt, 2013), universities need to explore the use of preventative interventions that have the potential to reach the entirety of the

student population. Regehr et al. (2013), in a recent meta-analysis on the effectiveness of interventions to reduce stress in university students, examined 23 cognitive, behavioural, and mindfulness-based interventions on a pooled analysis for self-reported anxiety; in addition, they combined six cognitive-behavioural and mindfulness-based studies for a pooled analysis for depression. With respect to anxiety, the cognitive, behavioural, and mindfulness-based interventions significantly reduced participants' anxiety compared to a control group. In addition, the authors report that the interventions were successful in significantly reducing participants' depression compared to a control group. Furthermore, for both anxiety and depression, the authors report that an independent analysis of mindfulness-based interventions showed significant improvements over control groups.

The finding that mindfulness-based interventions are associated with positive outcomes (e.g., reductions in stress) is further supported by two recent meta-analyses that examined the effectiveness of Mindfulness-based Stress Reduction (MBSR) for stress management in healthy participants (Chiesa & Serretti, 2009; Grossman, Niemann, Schmidt, & Walach, 2004). Chiesa & Serretti's (2009) meta-analysis on the effectiveness of MBSR for stress management in healthy people examined 10 controlled and randomized controlled studies that used either a passive (e.g., wait-list) or active (e.g., relaxation training) control group. While the researchers looked at a variety of outcomes, two are particularly important: pre- and post-test stress values between MBSR and a passive control group; and, pre- and post-test stress values between MBSR and an active control group. Chiesa and Serretti found that the MBSR group compared to a passive control group reported significantly lower levels of stress. However, the same cannot be said when comparing MBSR against an active control. In this case, the researchers were only able to examine one study that compared MBSR to an active control group (the study used a relaxation

training program). The researchers found that a *t*-test did not show any significant difference between the two treatments. However, the researchers interpreted this finding to mean that both programs were equally effective in reducing levels of stress. Nonetheless, the preliminary evidence so far would suggest that mindfulness-based interventions, in particular MBSR, are one effective way of reducing depression, anxiety, and stress.

The fact that MBIs appear to have the potential to produce a variety of positive outcomes including lowered rates of depressive relapse/recurrence after completion of MBCT (Teasdale, Segal, Williams, Ridgeway, Soulsby, & Lau, 2000; Ma & Teasdale, 2004; Kuyken et al., 2008); improved outcomes for patients with borderline personality disorder after completion of DBT (Linehan, Heard, & Armstrong, 1993; Verheul, Van Den Bosch, Koeter, De Ridder, Stinjen, & Van Den Brink, 2003); reduced levels of mood disturbance and stress in cancer outpatients after completion of MBSR (Speca, Carlson, Goodey, & Angen, 2000); reduced levels of self-reported experiences of pain in chronic pain patients after completing MBSR (Kabat-Zinn, 1982; Kabat-Zinn et al., 1985); and, improved psychological functioning in non-clinical populations after finishing MBSR (Shaprio, Schwartz, and Bonner, 1998; Shapiro, Astin, Bishop, and Cordova, 2005), would suggest that mindfulness and mindfulness meditation has the potential to be a trans-diagnostic tool for promoting positive change in both clinical and non-clinical populations. The research literature suggests that MBIs cause a change in a variety of conditions; however, it is less clear why and how these changes are occurring. By better understanding the mediators and mechanisms of change underlying mindfulness it will help in improving current evidence-based MBIs. In addition, by understanding these mechanisms we will be able to identify the areas where an MBI may be appropriate and where it may not (Gardner, Moore, and Marks, 2014).

Meditation: A Brief Introduction

Before we begin to address the skill of mindfulness, it is important to briefly place into context the use of meditation as a tool for therapeutic change in Western psychology. First, how we begin to define or conceptualize meditation depends on the cultural context we are looking at. Traditionally, in Western culture the term meditation has referred to "an exercise of ordered conceptual contemplation, involving the systematic and disciplined use of language, symbol, and concept" (Olendzki, 2009, pg. 37). This can be seen, for example, in Descartes' *Meditations on First Philosophy*. Another more contemporary way to think about meditation in Western thought is "a family of mental exercises that generally involve calmly limiting thought and attention" (Smith, 1975, pg. 558). For instance, a person focusing their attention on the sensations accompanying the breathing cycle can be considered a form of meditation. Conversely, in eastern Buddhist thought the Pali word for meditation is *samādhi*, which connotes a focusing of the mind and placing it upon an object. Furthermore, a prime characteristic of meditation in Buddhist thought is the term *ekaggatā*, which translates to one-pointedness (Olendzki, 2009). Thus, within Buddhist philosophy one conceptualization of meditation is the focusing of the mind on a single object and extending this focus in duration.

However, the key difference between the Buddhist perspective and that of the Western perspective is that within the Buddhist tradition meditation can also be used for non-conceptual thought—the experiencing of raw sensory stimuli. This allows for a broader range of phenomena to be experienced and is why a variety of meditations exist, because traditionally certain meditations (e.g., mindfulness meditation, loving-kindness meditation, compassion meditation) have been used to cultivate specific insights into the human condition (Grabovac, Lau, & Willet, 2011; Gunaratana, 2002). Western psychology researchers have typically supported the Buddhist

conceptualization of meditation within clinical contexts (Kabat-Zinn, 1982; Lynch, Chapman, Rosenthal, Kuo, & Linehan, 2006; Teasdale, Segal, & Williams, 1995), that is to say Western researchers view meditation per se as the self-regulation of attention. This is clearly reflected by Kabat-Zinn (1982) who defined meditation as "the intentional self-regulation of attention from moment-to-moment" (pg. 34). Another way of saying this is that meditation is a tool meant to cultivate self-regulation, with emotion regulation being an important sub-component of self-regulation.

Psychological researchers have discussed the use of meditation as a possible therapeutic tool as early as 1936 (Smith, 1975). More contemporary researchers such as Goleman (1971) argue that meditation is a "meta-therapy": accomplishing the main goals of conventional therapy while at the same time envisioning an end-state that is far beyond the scope of traditional therapy (as cited in Smith, 1975, pg. 558). In Smith's (1975) review of the early meditative studies the predominant focus in the literature surrounded a single-field meditative technique, transcendental meditation (TM), and the studies are marred with methodological flaws ranging from no randomization of participants to any passive/active control groups. Nevertheless, Smith is able to draw three main conclusions about the state of the research at the time in relation to meditation as a therapeutic tool. First, novice meditators who practice TM over a period of 4-10 weeks typically show more improvement over a variety of measures such as state and trait anxiety compared to non-meditators. Second, participants who are randomized into a condition to learn and practice meditation show more improvement over 4-10 weeks than control subjects assigned to an alternate treatment. Finally, and perhaps most importantly, the serious methodological flaws seen in the research literature up to that point prevents any firm conclusion that meditation has therapeutic potential.

Smith's finding raises the question: what has changed in the research literature since then that challenges his original conclusion? One likely beginning that can be found in the research literature is Goleman and Schwartz's (1976) study of TM as a possible intervention (or emotion regulation strategy) in stress reactivity. However, it isn't until the 1980s that a systematic investigation of meditation, in particular mindfulness meditation (MM), begins thanks to the pioneering work of Kabat-Zinn (1982) and Kabat-Zinn et al. (1985). At the time, previous research had demonstrated that TM practitioners display a relaxation response—characterized by decreases in oxygen consumption, heart rate, breathing rate, decreases in blood pressure for some people, and increase in alpha wave activity—when meditating (Benson, Beary, Carol, 1974; Benson, 1993). However, it remained unclear if this state effect would generalize beyond the meditative state. Therefore, meditation per se may have therapeutic potential if the *state* effects commonly associated with meditation show a carry over into *trait* effects, or if the mindful state generalizes to outside of formal meditation. The former refers to the "altered sensory, cognitive, and self-referential awareness that can arise during meditation practice" (Cahn & Polich, 2006, pg. 181), whereas the latter refers to "the lasting changes in these dimensions that persist in the meditator irrespective of being actively engaged in meditation" (Cahn & Polich, 2006, pg. 181). In other words, does the practice of meditation lead to enduring changes in meditators that produce the salutary effects commonly associated with meditation?

For their study, Goleman and Schwartz (1976) enlisted 30 experienced TM practitioners and 30 controls assigning them sequentially to one of three conditions randomly: meditation, relaxation with eyes closed, and relaxation with eyes opened. The results suggest that while the meditators in the study actually demonstrated an increase in autonomic stress arousal in the minute prior to a film's accident scenes, they also showed a greater recovery in the minute after

the stressful event compared to controls. Furthermore, it should be noted that participants in the meditation condition showed similar greater recovery from the stressor relative to the non-meditation condition. From these findings the authors' argue that there are two components in the autonomic response to stress: an anticipatory phase characterized by increased arousal, followed by a recovery phase characterized by inhibited arousal. This suggests that *if* meditation has therapeutic potential for stress one effect may be related to changes in a person's ability to quickly recover from a stressor.

More contemporary researchers have used brain-imaging studies to demonstrate that meditators compared to non-meditators appear to have enduring changes in brain organization and activation related to self-regulation (Hölzel et al., 2011; Tang, Lu, Geng, Stein, Yang, and Posner, 2010; Lazar, Kerr, Wasserman, et al., 2005; Brefczynski-Lewis, Lutz, Schaefer, Levinson, & Davidson, 2007). For instance, the anterior cingulate cortex (ACC) has been implicated as an area in the brain involved in monitoring and resolving conflict during information processing (van Veen & Carter, 2002; van Veen, Cohen, Botvinick, Stenger, & Carter, 2001) and self-regulation (Posner, Rothbart, Sheese, & Tang, 2007). Researchers believe that activation of the ACC during meditation may allow the practitioner to sustain attention on the task and resolve any conflicts that interfere with the goal of the meditation (Hölzel et al., 2011). In support of this, functional imaging research has demonstrated that meditators compared to age-, gender-, and education-matched controls show greater activation in the rostral ACC when meditating or awaiting an electrical shock (as cited by, Hölzel et al., 2011). The previous findings are salient because research also indicates that the rostral ACC is more closely involved in emotional functions compared to the dorsal ACC (Banich & Compton, 2011)—suggesting both greater emotion regulation and emotion processing capabilities.

Building on functional imaging findings, Tang et al. (2010) used structural imaging techniques (Diffusion Tensor Imaging) to explore any underlying structural changes that may occur as a result of meditation training. In their study the researchers compared participants who were randomly assigned to 11 hours of integrative body-mind training (IBMT) or relaxation training. IBMT was developed in the 1990s and is adapted from traditional Chinese medicine with the intention of integrating meditation and mindfulness traditions. Prior research by Tang, Ma, Wang, Fan, et al. (2007) had demonstrated that training in IBMT improves attention and self-regulation as measured by changes in Attention Network Test (ANT) scores (for detailed description of the ANT, see: Fan, McCandliss, Sommer, Raz, & Posner, 2002). In Tang et al.'s (2010) study the researchers measured changes in fractional anisotropy (FA) to monitor changes in white matter tract efficiency. FA is a method for quantifying white matter tract efficiency based on the principles of diffusion, with 0 indicating isotropy or low white matter tract efficiency and 1 indicating anisotropy or greater white matter tract efficiency (Mori & Zhang, 2006). Research suggests that lower anisotropy in the frontal and temporal lobes, which would suggest poor white matter tract efficiency, has been linked to affective disorders (Sexton, Mackay, & Ebmeier, 2009). The researchers discovered that participants, who had undergone 11 hours of relaxation training, did not display significantly greater FA in white matter tracts; however, those in the IMBT group showed significantly greater FA in multiple areas. The area of greatest increase was seen in the left anterior corona radiata (LACR), however no significant increase in the right anterior corona radiata was found (Tang et al., 2010). Research has identified the anterior corona radiata as an important white matter tract connecting the ACC to the striatum and other structures (as cited in Tang et al. 2010). Furthermore, the findings of both functional and structural changes in the ACC are significant because its dysfunction may lead to

ruminative and egocentric attention (Farb, Anderson, Segal, 2012), thereby contributing to depressive symptoms.

The above preliminary findings would seem to suggest that meditation does in fact have the potential to produce enduring changes at the neuroanatomical level, thereby altering behaviour. Furthermore, these findings suggest that meditation also has therapeutic potential. While meditation can take a concentrative (Pali: *samatha*) form, it can also take the form of what Theravada Buddhists would call *sati*, or mindfulness (Gunaratana, 2002). Thus, the two main forms of meditation are concentrative meditations, or single-field meditation (SFM), and mindfulness meditations, or open-field meditation (OFM). In a single-field meditation, a person voluntarily focuses their attention on a particular object or sensation in a sustained fashion, whereas open-field meditation involves the non-reactive monitoring of the contents of moment-to-moment experience, generally as a way to cultivate insight into one's emotional and cognitive patterns (Siegel & Germer, 2012). Finally, a last form of meditation often subsumed under the mindfulness meditation umbrella is: *metta*, or loving-kindness meditation (LKM). For practitioners of metta, this meditation is about cultivating the intention to be loving and kind, both to one's self (e.g., self-compassion) and all sentient beings (Siegel & Germer, 2012). Furthermore, research has demonstrated that by approaching our experiences with kindness and love we can cultivate mindfulness (Germer & Neff, 2013; Neff & Germer, 2013; Hofman, Grossman, & Hinton, 2011). Finally, it is important to note the distinct difference between SFM vs. OFM because they may interact with different areas of the brain and therefore produce different outcomes (Lutz, Slagter, Dunne, & Davidson, 2008).

In a typical SFM the practitioner may be instructed to focus on their breath sensation, when their attention wanders, the practitioner is instructed to notice the shift in attention and

gently bring their attention back to the breath. One reason for the focus on the breath is because for most people the breath is affectively neutral (Carmody, 2009). As such, it may help to facilitate the learning of new associations to compete with previously learned behaviours elicited by the initial mental event (Baer, 2003; Carmody, 2009). Conversely, OFM is more varied, but generally involves the focusing of attention on the moment-to-moment experience, monitoring mental events as they arise with acceptance and non-judgment (Siegel & Germer, 2012; Lutz et al., 2008).

Lutz et al. (2008) hypothesize that the neural systems involved in SFM are those associated with conflict monitoring (e.g., dorsal ACC and dorsolateral prefrontal cortex), selective attention (e.g., temporal-parietal junction, ventrolateral prefrontal cortex, frontal eye fields and intra-parietal sulcus), and sustaining attention (e.g., right frontal and parietal areas and the thalamus). In support of this hypothesis, Brefczynski-Lewis et al. (2007) examined the neural basis of SFM in age-matched expert meditators (between 10,000-54,000h of practice) and novice meditators (no experience except for the 1-week prior to the study). In the study, participants underwent an fMRI while engaging in a concentrative meditation on an external visual stimulus or at rest. The researchers found that expert meditators showed significantly greater activation than novice meditators in a large number of the aforementioned attention-related brain regions including the dorsolateral prefrontal cortex (DLPFC), visual cortex, and superior frontal sulcus and intra-parietal sulcus. The neural systems thought to be involved in OFM will be discussed in the next section on mindfulness when reviewing Bishop et al.'s (2004) operational definition and how researchers think mindfulness meditation may work.

Mindfulness: What is it? What is it not?

A good starting point for the description of mindfulness in Western psychology is to first look at the Buddhist thought underlying the concept; however, an in-depth overview of Buddhist thought is beyond the scope of this paper so this section will focus on the aspects that have influenced Western conceptualizations of mindfulness (for a more in-depth review see: Gunaratana, 2002; Grabovac, Lau, Willett, 2011). At the most basic level, mindfulness is derived from Buddha's teachings about how we construct experience. According to the Buddha, the mind and body are products of material causes; furthermore, the mind and body can be a vehicle for transcendence. However, this should not be interpreted to mean a divine, metaphysical transformation. Instead, the practitioner sees a transformation of the mind—allowing for a higher quality of consciousness. For the Buddha, this would mean a "deep sense of personal well-being, but also the possibility of a more evolved way of being human" (Siegel, Germer, Olendzki, 2008, pg. 22). The Buddha's insights are important because it means that the ability for transformation lies within all of us. Of course, this raises the question of how did the Buddha believe we construct our experience and how can we cultivate insight into this process?

In their review on the history of mindfulness, Siegel et al. (2008) provide the following recount of the Buddha's thoughts on how experience is constructed. First, for the Buddha all experience involves a process whereby raw data streams into the mind through 'sense doors', or sense organs. The sense organs align, more or less, with contemporary notions of the human sensory system: the eyes, ears, nose, tongue, body, and mind. Once the raw data enters a sense organ it is then processed by the five primary categories/systems (in order): material form, consciousness, perception, feeling, and formation. The first four systems yield a sense of *what* is happening, while the fifth decides what we are going to *do*.

The first category, material form, acknowledges that the mind and body have a material, biological foundation. Next, consciousness entails the act of becoming aware of an object—sense impression or cognition—by one of the sense organs; furthermore, we can only be aware of one object at a time. This distinction, or perhaps lack of distinction, within Buddhist thought is that there is no discernible difference made between a sensory impression or cognition—they are treated as the same transient mental event (Grabovac et al., 2011). The third system, perception, identifies *what* is experienced through a series of learned associations or interpreting incoming data based on prior experiences. Fourth, feeling provides an instantaneous emotional tone to each moment of awareness as pleasant, unpleasant, or neutral. Finally, formations reflect the intentional stance we take toward all objects that we perceive and to which we have feelings. Another way to think of this last point is that our intentions initiate and guide our conscious or unconscious choices to seek pleasant feelings and avoid unpleasant ones—this process of attachment and aversion leads to needless suffering (Grabovac et al., 2011). Of course this is an unfolding process, so what would this look like? As an example, imagine you are a student studying a textbook for a final exam. Your eyes see black lines against a white background in their visual field, which is quickly organized by the brain and perceived as words on a page. Concurrently you develop a negative emotional tone (i.e., unpleasant feeling) toward the textbook, and the intention forms to give up studying and take a break. In an attempt to avoid this unpleasant feeling you take a break and watch an episode of a television show you enjoy. Over time, these intentions and behaviours turn into dispositions; or, the learned behaviours people use to either prolong a pleasant feeling or end an unpleasant feeling. Therefore, the dispositions we form influence future responses to our experiences (Siegel et al., 2008; Grabovac et al., 2011). In other words, one way in which mindfulness may work is by facilitating the learning of new

associations and responses (similar to SFM) to compete with previously learned associations and responses (Baer, 2003; Carmody, 2009; Grabovac et al., 2011).

The unique insight of Buddhist thought is that consciousness is conceptualized as an ongoing process, that there is no "self", and a lack of awareness into how this process of attachment and aversion leads to habitual reactions causes suffering (Grabovac et al., 2011; Siegel et al., 2008). Instead, we have learned to connect the ongoing mental events into a coherent narrative, which gives the illusion of permanence or a stable self—which contributes to suffering. Thus, the Buddha's goal was to help people gain insight into the nature of this experience. Therefore, as Siegel et al. (2008) suggest, seeing the way the "self" is constructed can help "both us and [individuals] loosen our identification with the changing kaleidoscope of thoughts and feelings that arise in the mind, allowing us to live more flexible, adaptive, happier, productive lives" (pg. 25). In other words, mindfulness is about developing the insight that our mental events—sense impressions and cognitions—are transient, our habitual reactions of attachment and aversion to the emotional tones of mental events lead to suffering, and the self is impermanent. With this awareness an individual can detach from habitual reactions (e.g., "mental proliferation") to mental events and alleviate their suffering (Grabovac et al., 2011).

As mentioned in the previous section, the Pali word for mindfulness is *sati*, which connotes the idea of awareness, attention, and remembering (Gunaratana, 2002; Siegel et al., 2008). Siegel et al. (2008) suggest awareness allows us to detach from our emotions and preoccupations through the redirection of attention—which is focused awareness. Thus, instead of a person trying to control how they feel, the person can learn to *regulate* how they feel through this refocusing of attention. Furthermore, remembering is not used in the conventional sense here (e.g., long-term memory or "memories"); rather, it is focused on the intention, or why

a person is trying to be aware (Gunaratana, 2002). Thus, within the Buddhist tradition, mindfulness is an active process in which the practitioner is actively working with mental events with the intention of cultivating wisdom and insight into the workings of the mind and nature of the material world in the hopes of alleviating needless suffering (Grossman, 2010; Siegel et al., 2008). However, to make things a bit more complicated, *sati* is not the same as mindfulness meditation or as it is known in Pali: *vipassana bhavana*. The best way to make this distinction clear is to think of mindfulness meditation as a tool that is used to cultivate the *skill* of mindfulness. Vipassana bhavana can be broken down into: 'vipassana' or insight, while 'bhavana' roughly translates as 'to cultivate' (Gunaratana, 2002; Siegel et al., 2008). Putting this all together then we can conceptualize vipassana bhavana as the cultivation of insight—or insight meditation, or as it is commonly known in the West: mindfulness meditation (MM). Therefore, the intention behind MM is to not choose a single object of focus, but to bring awareness to the nature of our ongoing experience. Thus, the prime distinction between MM and other forms of meditation (e.g., single-field meditation) is the cultivation of insight into the nature of one's personal conditioning and the nature of mental reality.

However, to further complicate things, mindfulness can also be cultivated by (and is necessary for) both the single-field and open-field meditative techniques (Siegel et. al, 2008). As mentioned earlier, single-field meditations have a focal object, usually the breath or a mantra. Thus, whenever a person is beginning to practice MM their thoughts will invariably wonder or become attached to a certain train of thought. When this occurs the meditator can revert to concentrative meditation (noting the divergence with curiosity, openness, and acceptance) to refocus their attention, before switching back to the MM (Grabovac et al., 2011). In this situation, the SFM is used to facilitate the cultivation of mindfulness.

As such, the background to mindfulness in Western psychology gets complicated quickly. Furthermore, Gunaratana (2002) is quick to point out that this is an experiential practice and trying to conceptualize this practice into a written description is very difficult. Nevertheless, it is easier to understand what mindfulness is when contrasted against what it is not. First, mindfulness is not about having a blank mind, rather it is about training the mind to be aware of moment-to-moment experience however it manifests. Second, mindfulness is not becoming emotionless; in fact, this is the opposite effect of mindfulness as research indicates that experienced practitioners have a greater awareness of internal bodily sensations (e.g., viscera), which contribute to emotions (Hölzel et al., 2011). Third, mindfulness is not about seeking bliss (Siegel et al., 2008), rather mindfulness is about observing mental events as they arise and allowing them to pass without becoming attached. Finally, mindfulness is not about relaxation; rather, mindfulness encourages the experiencing of all mental events (even unpleasant ones) (Baer, 2003). For example, mindfulness is not about escaping pain rather it increases our ability to bear it (Kabat-Zinn 1982; Kabat-Zinn et al., 1985). Thus, to bring this section to a close, mindfulness and MM places an emphasis on the bottom-up processing of sensory experiences in an effort to re-focus attention away from the "many 'upper level' schemas, narratives, beliefs, and other conceptual maps we normally use to guide our way through a day's experience" (Siegel et al., 2008, pg. 28).

Mindfulness: Western Conceptualizations and an Operational Definition

There is much debate in the literature over how to best define and measure mindfulness in Western psychology (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Baer, 2003; Bishop et al., 2004; Brown, Ryan, Creswell, 2007; Kabat-zinn, 2003; Sipe & Eisendath, 2012). However, as mentioned near the start of the paper, the present study will be adopting the

operational definition of mindfulness put forth by Bishop et al. (2004). Before elaborating on Bishop et al.'s definition it is important to briefly discuss how other researchers have conceptualized mindfulness.

Perhaps the best starting point for an introduction of Western conceptualizations of mindfulness is from Kabat-Zinn (2003) who defines the process as: "the awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment" (pg. 145). Thus, for Kabat-Zinn, MM begins with a focus on the breath until attention is relatively stable, and then this field of awareness is expanded gradually to include all aspects of experience as they occur in a moment-to-moment fashion (Kabat-Zinn, 1982). In a similar manner Brown, Ryan, and Creswell (2007) have formally defined mindfulness as "a receptive attention to and awareness of events and experience" (pg. 212). Likewise, within MBCT mindfulness has been defined as, "the awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to things as they are" (Sipe & Eisendrath, 2012, pg. 63). Finally, Siegel and Germer (2012) suggest that mindfulness is "awareness, of the present moment, with acceptance" (pg. 9). Thus, with the importation of mindfulness and mindfulness meditation into Western psychology, additional qualities of non-judgment and acceptance have been explicitly added to the mental qualities of *sati*.

Now, as mentioned earlier the operational definition put forward by Bishop et al. (2004) is a two-component model characterized by 1) attention regulation and 2) a particular orientation to experience. Thus, as a reminder, Bishop et al. (2004) define mindfulness as: the self-regulation of attention so that is maintained on immediate experience, thereby allowing for increased recognition of mental events in the present moment; facilitated by the adoption of an orientation

to experience in the present moment that is characterized by curiosity, openness, and acceptance. Let's take a closer look at these components before exploring the putative mechanisms for the salutary effects related to mindfulness.

Attention Regulation

Mindfulness requires the practitioner to bring awareness to the current experience; as such, skills in sustained attention and switching would be required to maintain this awareness. Posner and Rothbart (1992) suggest that sustained attention refers to the ability to maintain a state of vigilance over prolonged periods of time (as cited in, Bishop et al., 2004). Switching allows the practitioner to bring awareness back to the breath sensations if they become caught up in mental event. Thus, switching involves the flexibility of attention so that a person can shift focus from one object to another (Bishop et al., 2004; Posner, 1980). Research indicates the ACC has been associated with both the ability to sustain and switch attention, which as we have seen is also an important component of single-field meditations (Hölzel et al., 2011; Posner & Rothbart, 1992; Posner et al., 2007). Bishop et al. (2004) also suggest that the self-regulation of attention helps to inhibit secondary elaborative processing (e.g., rumination, worry, etc.) of the mental events that reach our awareness. Furthermore, mindfulness can also be thought of as a meta-cognitive skill because it requires both the control of cognitive processes and the monitoring of the stream of consciousness (Bishop et al., 2004). In other words, MM should facilitate a reduction in rumination because practitioners learn to notice mental events as transient and not develop an attachment to them; that is, they re-direct attention back to the ongoing stream of consciousness and new associations are learned for the initial stimulus. In fact, Jain, Shapiro, Swanick, et al. (2007) in a randomized controlled trial of MM compared to an active control (relaxation training) found significant pre-post decreases in both distractive and

ruminative thoughts and behaviours compared with the control group. Furthermore, Shapiro, Brown, and Biegel (2007) found that therapists who underwent an MBSR intervention, increases in mindfulness predicted changes in rumination.

Orientation To Experience

The second component of the definition is the orientation to experience, which begins with the commitment to maintain an attitude of curiosity about 1) where the mind wanders whenever it drifts away from the bottom-up, open-monitoring characterized by MM; and, 2) a curiosity about the objects within one's experience at any given moment. Because the practitioner of mindfulness is typically instructed to ride the stream of consciousness, there is a component of acceptance. Hayes (2004b) defines acceptance as "active nonjudgmental embracing of experience in the here and now" (pg. 21, as cited in Germer & Siegel, 2012). Similarly, Roemer and Orsillo (2002) define acceptance as "being experientially open to the reality of the present-moment" (pg. 60). In other words, mindfulness involves changing the relationship individuals have to experience by fostering a mindset characterized by curiosity, openness, and acceptance. Thus, these changes in how people approach their experience should lead to emotional distress being experienced as less unpleasant and threatening since the context of curiosity, openness, and acceptance changes the subjective meaning of the experience (Bishop et al., 2004). There is some evidence in support of this, for example Keng, Smoski, Robins, Ekblad, and Brantley (2012) found that adults randomly assigned to complete an MBSR course compared to a wait-list control group showed significantly greater decreases in fear of emotions, suppression of anger, aggressive anger expression, worry, and difficulties regulating emotions. The researchers then replicated these findings in the wait-list control.

Furthermore, in a similar line with the Buddhist thought underlying mindfulness, MBIs such as MBCT provide the opportunity to gain insight into the nature of our mental events as being transient rather than being an inherent aspect of the self or valid reflection of reality (Bishop et. al, 2004; Teasdale, Segal, Williams, 1995; Teasdale, Segal, Williams, Ridgeway, Soulsby, & Lau, 2000). Thus, Bishop et al. (2004) suggest that as a result of this insight practitioners of mindfulness should have enhanced autobiographical memory recall characterized by greater specificity in cognitive representations in self-narrative. There is some preliminary evidence to support this hypothesis (Teasdale, Moore, Hayhurst, Pope, Williams, Segal, 2002; Heeren, Van Broeck, Philippot; 2009). For example, Heeren et al. (2009) found healthy participants who underwent MBCT compared to matched controls showed greater autobiographical memory specificity as measured by the Autobiographical Memory Test (AMT) Specific sub-scale. The two other sub-scales, Categorical and Extended, showed significant decreases as well, which suggests a more present-oriented mode of relating to experience. These findings would seem to support that mindfulness could also be seen as a process for enhancing episodic memory through the adoption of a “decentred", present-oriented perspective (Bishop et al., 2004; Fresco et al., 2007). Fresco et al. (2007) define decentring as: “the ability to observe one’s thoughts and feelings as temporary, objective events in the mind, as opposed to reflections of the self that are necessarily true” (pg. 234).

The proposed operational definition by Bishop et al. (2004) suggests that mindfulness is a mode, rather than a trait. Bishop et al. (2004) use mode in lieu of state because the term mode reflects the manner or way in which a thing is done. Thus, it is their belief that this definition better reflects that mindfulness is a psychological process. Therefore, mindfulness is a mode of awareness that is achieved when attention is directed to the present moment with curiosity,

openness, and acceptance. When attention is no longer directed in this way the state is lost. Now that mindfulness has been placed into context the question now becomes how does mindfulness work?

Additional Putative Mechanisms

Before beginning this section it is important to note that while other models do exist that attempt to explain the mechanisms of change involved in mindfulness such as Carmody's (2009) Attention Regulation Model or Baer's (2009) Self-focused Attention Model, these models tend to place an exclusive focus on the breath with an orientation of acceptance. That is, these models focus on just attention regulation using concentrative meditation rather than mindfulness per se (Grabovac et al., 2011). The basic underlying mechanisms about how MBSR and MBCT may work have been mentioned at the start of this paper. For an in-depth overview of these assumptions please refer to Carmody, Baer, Lykins, & Olendzki (2009) and Teasdale et al. (1995), respectively. Nevertheless, the operational definition for mindfulness adopted for the present study provides a good starting point for a statistically derived model (Coffey & Hartman, 2008; Coffey, Hartman, Fredrickson, 2010) of how mindfulness might work, which can then be expanded based on new research findings.

Coffey et al. (2010) suggest at least three mechanisms to explain the impact of mindfulness on ameliorating psychological distress. The first is emotion regulation or a person's ability to "influence which emotions they have, when they have them, and how they experience and express these emotions" (Gross, 1998a, pg. 275). The second mechanism is decreasing rumination, which is associated with the development and sustainment of depressive episodes (Nolen-Hoeksema, 2000). Finally, the researchers suggest a third mechanism is the ability for mindfulness to facilitate non-attachment (or decentring), which then reduces rumination and

psychological distress. To explore these mechanisms the researchers conducted a series of studies to extend the findings of and address the limitations of a previous study (Coffey & Hartman, 2008), which provided preliminary support for these mechanisms as mediators between mindfulness and positive mental health outcomes. However, Coffey & Hartman only used the MAAS in their initial study, which limited the ability of the researchers to explore the other facets of mindfulness contained in the five-factor mindfulness questionnaire (FFMQ: Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Baer et al. (2006) derived the FFMQ from existing self-report measures of mindfulness after discovering the independent questionnaires used to measuring mindfulness—MAAS, FMI, KIMS, CAMS, and MQ—all loaded onto five factors: non-reactivity to inner experience, observation of experience, acting with awareness, describing experience, and non-judging of experience. Baer et al. (2006) in an independent sample were then able to confirm this factor structure using confirmatory factor analysis. Therefore, Coffey et al. (2010) addressed this limitation by incorporating the FFMQ into their follow-up study.

Coffey et al. (2010), in their follow-up study, conducted two studies with the intention of: 1) examining the relationship between mindfulness and emotion regulation and 2) exploring how mindfulness and emotion regulation might influence their proposed mediators. The first study used a series of complex data analytic techniques to determine the relationship between the factor structures of mindfulness and emotion regulation (see Coffey et al., 2010, for detailed recount of the data analysis). Thus, in the first study the researchers used self-report, correlational data collected from undergraduate students to explore these relationships. Results from the final exploratory factor analysis suggested that mindfulness and emotion regulation, as measured by the researchers, assessed “heterogeneous and overlapping constructs” (Coffey et al.,

2010, pg. 242), which loaded on four factors: 1) present-centred attention, 2) acceptance of experience, 3) clarity about one's internal experience, and 4) the ability to manage negative emotions. To address this overlap the authors modified their model (e.g., removed sub-scales) to adjust for the overlap between the FFMQ and the Difficulties in Emotion Regulation Scale (DERS: Gratz & Roemer, 2004). Finally, using the operational definition proposed by Bishop et al. (2004), the researchers conducted a path analysis to test the following model: mindfulness predicts clarity about one's emotional experience, which in turn predicts negative emotion regulation. Furthermore, the model explored the potential direct effects mindfulness might have on negative emotion regulation.

Thus, in Coffey et al.'s (2010) model, "attention to one's experience and acceptance of that experience jointly influenced an individual's clarity about his or her experience. Clarity about one's experience in turn significantly predicted one's ability to effectively regulate negative" (pg. 243). Furthermore, attention and acceptance factors were not significantly correlated; moreover, the acceptance factor independently affected clarity and negative emotion regulation above and beyond the contribution of the attentional factor. Coffey et al.'s (2010) finding is particularly salient because it provides support for Bishop et al.'s (2004) two-component operational definition of mindfulness. Furthermore, the importance of acceptance in predicting positive change supports the primacy of this factor in the salutary effects associated with MBIs (Baer, 2003).

Coffey et al. (2010) in the second part of the study, using an independent sample, attempted to replicate the factor structure identified in the first part of the study and to further test the mechanisms from the Coffey and Hartman (2008) model. Participants in this study were undergraduate students who completed a series of self-report measures, including two different

dimensions of mental health—psychological distress and flourishing mental health, or the sense that one is living a rich and satisfying life (Keyes, 2005). The researchers extended their model by also examining how an increased ability to regulate negative affect contributes to greater non-attachment (or decentring), which in turn leads to a reduction in rumination. Thus, improved negative emotion regulation and decreased rumination would then predict improved mental health. Furthermore, the researchers examined how mindfulness impacts both a positive form of mental health (e.g., flourishing) and a negative form (e.g., psychological distress). Coffey et al. (2010) report that the model proposed produced acceptable fit to their data. Furthermore, as in the first study, attention and acceptance were unrelated.

In summation, there are three key points to keep in mind based on the findings of Coffey and Hartman (2008) and Coffey et al. (2010). First, the overlap in their measurement of mindfulness and emotion regulation would seem to suggest that current conceptualizations of mindfulness and emotion regulation lead to the measuring of similar underlying factors. However, this is not surprising when mindfulness is viewed as just another emotion regulation strategy—similar to cognitive reappraisal. As such, Coffey et al. (2010) have presented the Carolina Empirically-Derived Mindfulness Inventory (CEDMI) as a potential measure of both mindfulness and emotion regulation. However, the CEDMI has received little research attention to date. Second, the results provide convincing support for Bishop et al. (2004) two-component definition for mindfulness as a parsimonious definition, which is able to accurately differentiate mindfulness from other similar constructs and processes. Finally, the researchers findings demonstrate the importance of acceptance and attention regulation in both mindfulness and emotion regulation.

Based on these findings there is provisional support for at least three mechanisms of change as a function of increases in self-reported mindfulness: 1) attention regulation, 2) emotion regulation, and 3) changes in perspective on the self. However, Hölzel et al. (2011) in their review of the extant literature from a neural perspective propose an additional fourth mediator and/or mechanism: body awareness. Finally, there is some evidence to suggest that self-compassion (Neff, 2003) may be a fifth mechanism of change (Hölzel et al., 2011; Hollis-Walker & Colosimo, 2011). Thus, the salutary effects associated with mindfulness are potentially related to at least these five mechanisms and the interactions that occur amongst them. Because the mechanism of attention regulation was addressed when discussing Bishop et al.'s operational definition, let's take a look at some of the evidence to support the mechanisms of body awareness, emotion regulation, changes in perspective on the self, and self-compassion.

Body Awareness

Mehling, Gopisetty, Daubenmier, et al. (2009) define body awareness as "attentional focus on and awareness of internal body sensations" (pg. 1). As we saw in the section describing mindfulness, the focus of attention typically involves internal mental events. Thus, it is possible that increased levels of mindfulness may facilitate changes in interoception, or the ability to notice internal bodily sensations (Craig, 2003). In fact, there is evidence to support that practitioners' of MM self-report increases in awareness of bodily states. For instance, Carmody and Baer (2008) found that participants who self-selected into an MBSR class reported significant changes in the Observe subscale of the FFMQ, which is meant to measure awareness of bodily sensations. Carmody and Baer (2008) conducted paired sample *t*-tests and report that changes in this subscale score from pre-MBSR to post-MBSR scores were significant, which suggests that participants were indeed becoming more aware of their internal bodily sensations.

One potential reason for this significant increase is related to the components of MBSR, specifically the body scan and yoga components (Kabat-Zinn, 1982; Kabat-Zinn et al., 1985).

Furthermore, there is neuroimaging evidence to support changes in the function and structure of brain regions associated with interoception. Craig (2003) suggests that in humans interoceptive activity is correlated to activity in the right anterior insula and a motivation to address this bodily feeling is related to activity in the ACC. Furthermore, Critchley, Wiens, Rotshtein, Ohman, & Dolan (2004) report that local grey matter volume in this region correlates with both interoceptive accuracy and subjective ratings of visceral awareness (as cited in, Hölzel et al., 2011). In support of these predictions, Farb, Segal, Mayberg, et al. (2007) found that randomly assigned participants who underwent MBSR training compared to wait-list controls showed increased activation in viscerosomatic areas such as the right insula when the participants employed an experiential focus compared to a narrative focus (this key study will be elaborated on shortly). Finally, Farb, Anderson, Mayberg, et al. (2010) randomly assigned participants to either receive MBSR training or act as wait-list controls then measured differences in neural activity to sadness provocation from a series of short-film clips. Farb et al. (2010) report that the individuals who received MBSR training, while showing similar self-reported sadness as the controls, showed greater activation in areas associated with body sensation. Furthermore, Farb et al. (2010) report that greater activation in the right insula and right lateral PFC were significantly associated with decreased Beck Depression Inventory scores.

How might changes in body awareness be beneficial? Hölzel et al. (2011) suggest it is possible that an increase in the awareness of the body's response to an emotional stimulus might lead to a greater awareness of a person's emotional response tendencies. That is, by being more aware of one's own emotions a person can learn to regulate these emotions more effectively

(Chambers, Gullone, Allen, 2009; Farb et al., 2012). Thus, by directing attention to ongoing internal or external experiences, within the context of curiosity, openness, and acceptance, whenever an emotional reaction occurs the executive attention system (e.g., conflict monitoring) detects the conflict between emotion and the goal of maintaining the mindful mode. Due to the increased body awareness the person is able to detect the physiological aspects of the emotion and deploy the appropriate emotion regulation strategies (Chambers et al., 2009; Farb et al., 2012; Hölzel et al., 2011).

Emotion Regulation

This leads nicely into the third mechanism of emotion regulation. As a reminder, emotion regulation refers to the alteration in ongoing emotional responses through the action of self-regulatory processes (Gross, 1998a; Ochsner & Gross, 2005). Research using self-reported data shows that mindfulness is associated with improved positive mood states and decreased distractive/ruminative thoughts and behaviours (e.g., Jain et al., 2007). Furthermore, research using physiological data supports the hypothesis that meditation training facilitates a return to emotional baseline after reactivity (e.g., Goleman & Schwartz, 1976). There is also evidence to support the neural mechanisms underlying emotion regulation are also implicated as a mechanism of change in mindfulness. Research suggests that during emotion regulation in healthy people prefrontal networks detect and exert a top-down inhibition on emotion-generative systems in the sub-cortical regions, such as the amygdala, which are responsible for detecting affectively relevant stimuli (Chambers et al., 2009; Farb et al., 2012; Modinos, Ormel, & Aleman, 2010). Specifically, researchers believe the brain regions thought to be involved in this process are the dorsal regions of the lateral prefrontal cortex (PFC), implicated in selective attention and working memory; ventral regions of the PFC implicated in response inhibition; the

ACC, involved in monitoring control processes; and the dorso-medial PFC implicated in monitoring a person's emotional state (Chambers et al., 2009; Hölzel et al., 2011; Farb et al., 2012; Modinos et al., 2010; Ochsner & Gross, 2005). These regions are particularly salient because dysfunction in these fronto-limbic regions has been associated with mood disorders (Farb et al., 2012; Chambers et al., 2009). In other words, decreases in PFC activity and increases in amygdala activity appear to underlie a variety of mood disorders.

Of course this now raises the question of how is mindfulness involved in emotion regulation? Both Chambers et al. (2009) and Farb et al. (2012) propose that mindful emotion regulation is distinctly different from two common emotion regulation strategies—cognitive reappraisal and expressive suppression (Gross, 1998a,b). While cognitive reappraisal has received empirical support as an adaptive emotion regulation strategy and expressive suppression as potentially maladaptive (e.g., Gross, 1998b; Gross & Munoz, 2006). Chambers et al. (2009) raise the concern that the use of this strategy may result in "experiential avoidance in cases where its use is motivated by an unwillingness to risk experiencing or remain in contact with a particular negative emotion associated with the initial appraisal" (pg. 566). Similarly, Farb et al. (2012) raise the concern that in individuals with a mood disorder, efforts to re-appraise negative emotional states may make matters worse because attention is brought to the dysphoric emotion without a reduction in the intensity of said emotion. Fortunately, as discussed in this paper, mindfulness and mindfulness meditation targets these concerns because it helps facilitate the inhibition of secondary elaborative processing (e.g., rumination and worry) and promotes decentring. Thus, the research reviewed so far would suggest that mindfulness helps modify a person's experiences of emotion. Moreover, mindfulness seems to facilitate a shift in the cortical regions activated during emotion regulation that are distinct from the dysfunctional mid-line

cortices towards a right-lateralized network involving the ventral and dorsolateral PFC (Farb et al., 2012).

In fact neuroimaging studies seem to support these conclusions. First, Creswell, Way, Eisenberger, & Lieberman (2007) in their study of the neural correlates of dispositional mindfulness involved during affect labeling, found that participants' dispositional mindfulness, as measured by the MAAS, was associated with increased activation in multiple regions of the PFC including the ventromedial PFC (VMPFC), medial PFC (MPFC), ventrolateral PFC (VLPFC), right dorsolateral PFC (DLPFC), and the left insula. Furthermore, the researchers observed dispositional mindfulness was significantly associated with bilateral amygdala deactivation during an affect labeling task compared to a gender labeling task. The findings would seem to suggest that individuals high in dispositional mindfulness appear to exert greater inhibitory control over the amygdala during an emotion generative task. However, it is important to note that the participants in this study had not undergone a MBI. Second, Farb et al. (2007) found in their study participants (randomly assigned) who had underwent MBSR training compared to wait-list controls showed increased activity during experiential focus in the VLPFC, which they also interpret as representing augmented inhibitory control of emotion-generative networks.

Change In Perspective Of Self

Farb et al.'s (2007) research dovetails nicely with the fourth mechanism of change, a change in perspective of the self. Furthermore, while Farb et al. (2007) provide evidence for functional changes in the brain related to self-referential processing, Hölzel, Carmody, Vangel, et al. (2011) provide evidence for structural changes in brain regions associated with self-referential processing and perspective taking, learning and memory processes, and emotion regulation. In

fact, these studies provide compelling evidence to support the conceptualization of mindfulness discussed up to this point. That is, by switching to a more experiential-mode of being, insight is gained into the transient nature of experience, thereby reducing needless suffering. Furthermore, these studies help support the Buddhist notion that there is no enduring "self", which is different than how the West has historically conceptualized the self as an enduring, separate entity. For instance, William James (1890) posited that there is the 'me' represented across time to make sense of the 'I' acting in the present moment (as cited in, Hergenhahn, 2009). Therefore, because mindfulness is meant to cultivate insight into this illusion of permanence a shift towards a more experiential way of being should occur. In fact, this shift in relating to our moment-to-moment experience is thought to be one of the reasons why MBCT works (Sipe and Eisendrath, 2012). In other words, there appear to be two distinct modes of self-reference. The first is a narrative self-reference, supported by medial prefrontal cortices, which functions to maintain continuity of identity across time (Gallagher, 2004). The second is momentary self-reference, or experiential self-reference, which researchers have hypothesized to be supported by right lateralized exteroceptive somatic and interoceptive insular cortices (Damasio, 1999, as cited in Hölzel et al., 2011; Craig, 2004; Critchley et al., 2004).

Farb et al. (2007) investigated this dual-mode hypothesis of self-reference with a cross-sectional study using fMRI during "two temporally distinct foci of attention: the self as experienced across time and in the immediate moment" (pg. 313). Participants that self-selected into a MBSR program were randomized into a pre-training wait-list control group or a MBSR group. Participants were presented with verbal stimuli that consisted of eight sets of six personality traits and asked to engage in either: 1) a narrative focus (NF) mode, reflecting on what the trait meant about them as a person or 2) an experiential focus (EF) mode, monitoring

their moment-to-moment experience in response to the adjectives. Results of the fMRI analysis revealed that participants who received MBSR training when engaging in EF relative to NF were associated with significant reductions in ventral and dorsal mPFC activity, but not the control group. In addition, for the MBSR group, EF resulted in significantly greater recruitment of the right lateral PFC, right insula, and inferior parietal lobule, but not in the control group. Thus, EF showed deactivations along the medial cortical regions associated with NF and increased recruitment of the hypothesized right lateralized cortical regions involved in EF. However, as the researchers note their study does not support a claim that mindfulness training allowed for the increased differentiation between the two modes of self-reference because this was not a true pre-/post-intervention design. Rather, the findings suggest that EF is facilitated by the ability to inhibit the default mPFC networks, which appears to be associated with mindfulness training. Nevertheless, these findings in conjunction with the structural findings in the Hölzel et al. (2011) study, which did use a true pre-post study design involving MBSR, would seem to suggest that a change in self-perspective is an additional mechanism of change associated with mindfulness.

Self-Compassion

This brings us to the last putative mechanism of change—self-compassion. Neff (2003a) defines self-compassion as involving three components: 1) self-kindness, the extension of kindness and understanding to oneself rather than harsh judgment and self-criticism; 2) common humanity, seeing one's experiences as part of the larger human experience; and 3) mindfulness, holding one's painful thoughts and feelings in balanced awareness rather than over-identifying with them. Thus, a clear relationship appears to exist between self-compassion and mindfulness as conceptualized in this paper. In fact, Hollis-Walker & Colosimo (2011) found a strong correlation between levels of self-compassion, measured by the Self-Compassion Scale (Neff,

2003b), and levels of mindfulness, measured by the FFMQ, in non-meditators. However, it is important to note that the correlations were not high enough to suggest the same construct is being measured. Furthermore, the authors report that self-compassion partially mediated the relationship between dispositional mindfulness and psychological well-being. This means self-compassion partially explains some of the impact mindfulness has on psychological well-being. Finally, Van Dam, Sheppard, Forsyth, and Earleywine (2010) compared the ability of the SCS and MAAS to predict symptom severity in mixed anxiety and depression in a large community sample seeking help for anxious distress. The researchers found evidence to support the role of self-compassion as a better predictor of symptom severity compared to levels of mindfulness. That is, higher levels of self-compassion were associated with lower levels of symptom severity.

There is also evidence to support the importance of self-compassion in MBIs. For example, Kuyken et al. (2010) found that the positive effects of MBCT on depressive symptomatology at 15-month follow-up were mediated by enhancement of both mindfulness and self-compassion. In addition, following MBCT there was no support for a relationship between cognitive reactivity and depressive symptomatology, with evidence that this relationship was ameliorated by the enhancement of self-compassion. What is particularly salient about this finding is that for the control group (maintenance antidepressant treatment) greater cognitive reactivity was associated with poorer outcome. Furthermore, Shapiro et al. (2005) in a RCT examining the impact of MBSR for healthcare professionals report that compared to a wait-list control there was a significant difference in pre-post changes in self-compassion. In addition, the authors report "changes in self-compassion significantly predicted positive changes in perceived stress but did not have predictive power for satisfaction with life" (Shapiro et al., 2005, pg. 170). However, due to the small sample size these findings should be interpreted with caution.

To my knowledge there does not appear to be any neuroscientific findings related to self-compassion (Neff, 2003) within the context of MBIs. However, the development of the Mindful Self-Compassion (MSC) program (Neff & Germer, 2012) provides one potential starting point for pre-post functional and structural neuroimaging studies, and behavioural studies. Neff & Germer (2012) in an RCT of the MSC program demonstrated that their MBI produced significant increases in participants self-reported levels of both self-compassion and mindfulness compared to wait-list controls. Nevertheless, Hölzel et al. (2011) suggest that self-compassion is likely related to emotion regulation and a change in perspective of the self. This suggests that future brain imaging studies should explore the regions involved in these processes.

In closing, there is ample evidence to support the putative mechanisms of change discussed in this section; however, self-compassion as conceptualized by Neff (2003a, b) is fairly recent and requires further research. Furthermore, the interaction between these mechanisms is likely what facilitates the enhanced self-regulation that leads to the salutary effects associated with practicing mindfulness meditation and the concomitant changes in mindfulness and self-compassion. Karoly (1993) suggests that self-regulation is as a process that enables individuals to guide their goal-directed activities by modulation of thought, affect, behaviour, or attention via deliberate or automated use of specific mechanisms (as cited in, Hölzel et al. 2011). In this review evidence has been provided to support the argument that mindfulness and mindfulness meditation meet the criteria for a form of self-regulation as suggested by Karoly (1993). Furthermore, understanding the process of how mindfulness meditation and MBIs lead to positive outcomes will help to enhance current and future programs.

Present Study

To summarize, the present study has adopted the operational definition as defined by Bishop et al. (2004), which suggests mindfulness is a mode of awareness that is achieved when attention is focused on the present moment within the context of curiosity, openness, and acceptance. Ample evidence has also been provided to demonstrate that mindfulness, as it is incorporated into MBIs, is associated with and predicts changes in multiple indicators and predictors of psychological functioning. Finally, evidence has been provided to support the following putative mediators/mechanisms of change associated with mindfulness: 1) attention regulation, 2) body awareness, 3) emotion regulation, 4) change in perspective of self, and 5) self-compassion.

Nevertheless, with mindfulness becoming such a popular technique in the West, perhaps the biggest issue is surrounding participation in MBIs—due to the significant financial and time investment. For example, the typical MBSR program is an expensive, 8-week, manualized program with group sessions once a week, followed by homework (e.g., 45-minute meditations daily between classes), and a day long mindfulness retreat. The financial and time investment required to participant in MBSR (and other MBIs) raises the legitimate concern of whether or not such programs can have widespread deployment on campuses to meet the mental health needs of their students. Therefore, the present study aims to address this concern by exploring whether or not the positive benefits associated with mindfulness will be seen outside of the formal MBI. In other words, if students are given a brief introduction to the theory of mindfulness and practice a single mindfulness meditation, will mindfulness' positive benefits manifest?

In the present study I will be exploring the above question by examining the potential salutary effects produced by a brief 25-minute mindfulness meditation known as loving-kindness

meditation (LKM). Loving-kindness, is conceptualized as, "a caring attitude toward ourselves and others, especially in the midst of suffering" (Siegel & Germer, 2012). Furthermore, this meditation is subsumed under the mindfulness umbrella and research suggests loving-kindness meditation can increase levels of mindfulness and self-compassion (Barnard & Curry, 2011; Hofman, Grossman, & Hinton, 2011); however, it has received little attention to date in the literature compared to single-field and open-field meditations (Siegel & Germer, 2012). In theory, because LKM is meant to cultivate the intention of being open, accepting, and self-compassionate to our experiences it should produce similar positive outcomes to those seen in both SFM and OFM. The meditation is a guided meditation from Dr. Siegel's (2012) *The Mindfulness Solution*, permission has been granted to use the recording in my study.

Based on my review of the literature the following hypotheses will be tested:

Hypothesis 1: Participants exposed to the limited-MBI should have higher levels of self-reported mindfulness than the control condition.

Hypothesis 2: Participants exposed to the limited-MBI should have higher levels of self-reported self-compassion than the control condition.

Hypothesis 3: Participants exposed to the limited-MBI should have lower levels of self-reported depression, anxiety, and stress, than the control condition.

Hypothesis 4: Participants exposed to the limited-MBI should have higher levels of decentring than the control condition.

Hypothesis 5: Participants exposed to the limited-MBI should have lowers levels of worry and rumination.

Hypothesis 6: Participants exposed to the limited-MBI should have different levels of self-reported positive affect and negative affect.

Methods

Participants

Participants for the study were recruited from students enrolled at the University of Prince Edward Island (UPEI) in three ways: 1) through presentations delivered to psychology courses, 2) posters placed around the campus, and 3) a post made to the Psychology Arts and Science Society's Facebook page. Using a random number generator[1] the 165 participants that expressed an interest in the research study were assigned to either the treatment or control condition and their names, along with a randomly generated number, were then entered into a spreadsheet. Each participant was then invited via email to attend an information and tutorial session if they were in the treatment group during the week of January 26th to February 1st (referred to as Time 1 or T1), whereas participants in the control condition were invited to attend an information session during the same week.

A total of 45 participants in the treatment condition responded to this invitation with 40 participants completing the information and tutorial session at T1, whereas 48 participants in the wait-list control condition responded to the email with 44 participants completing their information session. Because this research study was examining the impact of a limited MBI the exclusionary criteria included: 1) having received formal training in mindfulness (e.g., received training in MBSR or MBCT) or 2) having practiced meditation for more than 50+ hours. Two participants in their initial survey indicated they had received formal training in mindfulness and one participant indicated they had meditated for 50+ hours. As a result these participants were excluded from subsequent data analysis. Furthermore, one participant indicated they were 16 years of age this participant was also excluded from data analysis because they were not the age

[1] The exact process for random assignment can be found here: https://www.random.org/faq/#Q3.2

[2] Initially the study included a second survey time in the middle of the study period,

of majority. Thus, the T1 sample contained 38 participants in the treatment condition and 42 participants in the control condition (N=80). Please see Figure 1 for a chart detailing the flow of participants in the present study.

The T1 sample consisted of 61 women, 17 men, and 2 undisclosed gender identities. The average age of the T1 sample was 21.10 years old (SD = 4.695) and included 27 first year, 20 second year, 16 third year, 12 fourth year, and 4 fifth year students (one participant listed 'other' as their year of study). The majority of participants belonged to either the science (n=39) or arts faculty (n=37), with only one business student and three unclassified majors in the T1 sample. Over half (n=49 or 61.3%) of the T1 sample reported no prior experience with meditation, while 31 participants reported prior experience with meditation. A Chi-square analysis was used to determine if any significant differences existed between the treatment and control group based on age, gender, the year of study, faculty (collapsed into Arts & Science), or hours of prior meditation experience (collapsed into a 0-20 hours & 20-40 hours dichotomy). No significant differences were found, all p's > 0.05.

Study Design and Procedures

The study was conducted using a randomized, 2 (treatment vs. control) x 2 (pre-intervention vs. post-intervention) independent-samples design.[2] Participants in the treatment condition were given a standardized introduction to the theory of mindfulness adapted from the introduction section of this study and were introduced to the LKM they would be asked to practice at least 3 times a week for the duration of the study, or March 14th referred to as T2. The meditation used was an audio recording from Dr. Ron Siegel's (2012) book *The Mindfulness Solution*, permission to use his recording in the current study was granted from the author.

[2] Initially the study included a second survey time in the middle of the study period, however due to a low response rate this second survey was dropped from analysis.

Participants placed into the wait-list control group were asked to continue with their day-to-day lives and given the option to receive the same information given to the treatment group at the end of the study. Both the treatment and control condition completed identical sets of paper-based surveys at T1; however, an electronic-based survey was used at T2 covering the time period of March 14th-27th. Furthermore, participants in the treatment condition would also receive weekly emails with a link to a survey asking them to log the number of minutes spent meditating each day and to give a quality rating on the week's meditation practice. Two forms of compensation were offered for participants in the study: 1) participants were entered into a 50$ cash prize lottery or 2) if participants were in Psychology 102, and opted out of the 50$ cash prize lottery, they were offered a bonus mark for the online component of their course mark. Informed consent was gained during each respective group's information session. Finally, the study received approval from the UPEI Research Ethics Board.

Pre- and Post-intervention Measures

Positive and Negative Affect Scale Expanded (PANAS-X) (Watson and Clark, 1994). The PANAS-X is a 60-item self-report questionnaire designed to assess two higher-order valence states of Positive Affect (PA) (e.g., "strong", "inspired") and Negative Affect (NA) (e.g., "afraid", "nervous") and 11 lower-order content states (e.g., fear, self-assurance). The PANAS-X is rated on a scale ranging from 1 (*Very slightly or not at all*) to 5 (*Extremely*). For the current study only the PA and NA scales were examined. The PA and NA scales of the PANAS-X are scored by summing a participant's responses to the PA and NA items with higher scores reflecting greater levels of PA or NA. Internal consistency reliability coefficients (Cronbach's α*)* in this sample for PA at T1= 0.836 (T2= 0.928) and for NA at T1= 0.787 (T2= 0.917).

Ruminative Response Scale (RRS) (Gonzalez, Treynor, Nolen-Hoeksema, 2003)**.** The RRS is a 22-item self-report questionnaire designed to assess two sub-scales of "reflection" and "brooding" in response to depressed affect. Rumination as measured by the RRS has been demonstrated to have good predictive validity for the severity of depressive symptomatology and onset of major depressive episodes (Gonzalez et al., 2003). The RRS is rated on a scale from 1 (A*lmost never*) to 4 (A*lmost always*). The RRS is scored by summing a participant's response to the items (e.g., "Analyze recent events to try to understand why you are depressed" or "Write down what you are thinking about and analyze it") with higher scores representing higher levels of rumination. Cronbach's α for the RRS at T1= 0.890 (T2= 0.947).

Penn State Worry Questionnaire (PSWQ) (Meyer, Miller, Metzger, & Borkovec, 1990). The PSWQ is a 16-item self-report questionnaire designed to asses the psychological trait of worry. The PSWQ has been demonstrated to have good validity for assessing the trait of worry (Meyer et al., 1990). The PSWQ is rated on a scale from 1 (*Not at all typical of me*) to 5 (*Very typical of me*). The PSWQ is scored by taking a participant's response to the items (e.g., "My worries overwhelm me") and summing them to create a score, with higher scores representing higher levels of worry. Cronbach's α for the PSWQ at T1= 0.943 (T2= 0.962).

Self-Compassion Scale Short-Form (SCS-SF) (Raes, Pommier, Neff, & Gucht, 2011). The SCS-SF is a 12-item self-report questionnaire, rated on a scale from 1 (*Almost never*) to 5 (*Almost always*), designed to assess the psychological construct of self-compassion. The SCS-SF is scored by first reverse scoring a participant's responses to negative items (e.g., "When I fail at something important to me I become consumed by feelings of inadequacy"). Then, the negative items are summed with positive items (e.g., "I try to be understanding and patient towards those

aspects of my personality I don't like") for a final score. Higher scores on the SCS-SF reflect higher levels of self-compassion. Cronbach's α for the SCS-SF at T1= 0.862 (T2= 0.901).

Five-Factor Mindfulness Questionnaire (FFMQ) (Baer et al., 2006). The FFMQ is a 39-item self-report measure that examines five components of mindfulness: 1) non-reactivity to inner experience (FFMQ Non-react), 2) observation of one's internal experiences and sensations (FFMQ Observe), 3) acting with awareness versus automatic pilot (FFMQ Awareness), 4) describing inner experience (FFMQ Describe), and 5) non-judging of inner experience (FFMQ Non-judgment). The FFMQ is scored using a scale of 1 (*Never or rarely true*) to 5 (*Very often or always true*). Cronbach's α at T1 for FFMQ Non-react= 0.763 (T2= 0.920), FFMQ Observe= 0.777 (T2= 0.887), FFMQ Awareness= 0.795 (T2= 0.913), FFMQ Describe= 0.926 (T2= 0.895), and FFMQ Non-judgment= 0.891 (T2= 0.951).

Experiences Questionnaire (EQ) (Fresco et al., 2007). The EQ is a 20-item self-report questionnaire designed to measure the construct of decentring. As a reminder, decentring is "the ability to observe one's thoughts and feelings as temporary, objective events in the mind, as opposed to reflections of the self that are necessarily true" (Fresco et al., 2007, pg. 234). The EQ has been demonstrated to have good convergent and discriminant validity demonstrated by negative relationships with measures of experiential avoidance, rumination, emotion regulation, depression, and anxiety (Fresco et al., 2007). The EQ uses a scale from 1 (*Never*) to 5 (*All the time*) to measure levels of decentring. Higher scores on the EQ are thought to reflect a person's ability to approach their experience from a decentred perspective. Cronbach's α for the decentring sub-scale at T1= 0.867 (T2= 0.937).

Depression Anxiety and Stress Scale (DASS) (Lovibond & Lovibond, 1995). The DASS is a 42-item self-report questionnaire consisting of 42 negative emotional symptoms and three

scales: Depression, Anxiety, and Stress. Participants rate the extent to which they have experienced each symptom within the past week (e.g., "I felt downhearted and blue" or "I felt I was close to panic" or "I found it difficult to relax") on a 4-point scale (0 = *Did not apply to me at all* to 4 = *Applied to me very much, or most of the time*). Cronbach's α for DASS Depression at T1= 0.946 (T2= 0.956), DASS Anxiety at T1= 0.921 (T2= 0.947), and DASS Stress at T1= 0.918 (T2= 0.958).

Loving-Kindness Meditation Time (LKM Total). The LKM Total is a self-report questionnaire that participants in the treatment group were asked to complete every week for the duration of the study period. Participants were asked what day of the week they meditated for and how long. Meditation time was measured in minutes.

Data Analysis

To facilitate data analysis and to reduce variability within the dataset the raw scores on all pre- and post-intervention measures were transformed into average scores (e.g., total score divided by number of items on the measure). All analyses were run in Mac OS X 10.10.2 using SPSS Statistics 22, version 22.0.0.1 (SPSS, Inc., Armonk, NY, USA).

Because participants were randomized to either the treatment or control condition it was important to ensure that no differences existed between the two groups at T1 on the pre-intervention measures. Thus, t-tests were conducted between the two groups on all pre-intervention measures. All of the *t*-tests conducted between the treatment and control condition returned non-significant results (all *p*s > .05). To test the research hypotheses that the treatment condition would differ on variables at T2 compared to the control condition, a series of *t*-tests were conducted.

Results

Means with standard deviation for all pre- and post-intervention measures, by experimental condition, are reported in Table 1 and 2. Exact results of the *t*-tests conducted at T1 to ensure no significant differences on pre-intervention measures are reported in Table 3. To assess internal validity, Pearson *r* correlations for the relationships between the outcome measures at T1 and T2 were conducted and are located in Table 4 and 5. These correlations were in the expected direction and similar to previous research.

Mindfulness

On average, participants in the treatment condition had higher FFMQ Observe scores (M= 3.74, SE= .19) compared to the control condition (M= 3.22, SE= .15). This difference, .518, 95% CI [.035, 1.002], was significant $t(42)= 2.163$, $p< .05$, $d= 0.68$. Participants in the treatment condition, on average, had higher FFMQ Describe scores (M= 3.34, SE= .22), than those in the control condition (M= 2.89, SE= .22). This difference, .450, 95% CI [-.197, 1.097], was not significant $t(40)= 1.405$, $p> .05$. Participants in the treatment condition also had higher FFMQ Awareness scores (M= 3.24, SE= .21) than the control condition (M= 2.73, SE= .15). This difference, .518, 95% CI [.025, 1.011], was significant $t(41)= 2.12$, $p= .040$, $d= 0.71$. On average, participants in the treatment condition reported higher FFMQ Non-judgment scores (M= 3.74, SE= .23) compared to the control condition (M= 2.90, SE= .21). This difference, .842, 95% CI [.213, 1.470], was significant $t(42)= 2.704$, $p< .05$, $d= 0.81$. Finally, participants in the treatment condition reported higher FFMQ Non-react scores (M= 3.41, SE= .18) than the control condition (M= 2.48, SE= .15). This difference, .931, 95% CI [.462, 1.400], was significant $t(40)= 4.01$, $p < .0001$, $d= 1.30$. Examining these results together provides support for *Hypothesis 1* and

suggests that participants in the treatment condition had significantly higher levels of mindfulness compared to the control group.

Self-Compassion

On average, participants in the treatment condition had higher SCS-SF scores (M= 2.96, SE= .18), than the control condition (M= 2.37, SE= .16). This difference, .592, 95% CI [.111, 1.074], was significant $t(41)= 2.484$, $p< .05$, d=0.77. This result provides support for *Hypothesis 2* and suggests that participants in the treatment condition had significantly higher levels of self-compassion compared to the control group.

Depression, Anxiety, and Stress

For DASS Depression scores at T2, the variances were unequal for the conditions; therefore an adjusted *t*-test is reported. Participants in the treatment condition had lower DASS Depression scores (M= .30, SE= .09), than the control condition (M= 1.02, SE= .15). This difference, -.722, 95% CI [-1.084, -.360], was significant $t(35.143)= -4.051$, $p < .0001$, d=1.00. On average, participants in the treatment condition had lower DASS Anxiety scores (M= .32, SE= .11), than those in the control condition (M= .96, SE= .15). This difference, -.640, 95% CI [-1.046, -.235], was significant $t(39)= -3.195$, $p< .001$, d=0.88. Finally, participants in the treatment condition had lower DASS Stress scores (M= .53, SE= .13), than those in the control condition (M= 1.30, SE= .15). This difference, -.771, 95% CI [-1.197, -.345], was significant $t(42)= -3.654$, $p< .001$, d= 1.00. These results provide support for *Hypothesis* 3 and suggest that participants in the treatment condition had significantly lower levels of depression, anxiety, and stress compared to the control condition

Decentring

Participants in the treatment condition, on average, had higher scores on the EQ (M= 3.62, SE= .18), than the control condition (M= 2.74, SE= .11). This difference, .884, 95% CI [.477, 1.290], was significant $t(42)= 4.387$, $p < .0001$, $d= 1.57$. This result provides support for *Hypothesis* 4 and suggests that the treatment condition had significantly higher levels of decentring compared to the control condition.

Worry and Rumination

On average, participants in the treatment condition had lower scores on the PSWQ (M= 2.74, SE= .24), than those in the control condition (M= 3.89, SE= .19). This difference, -1.15, 95% CI [-1.762, -.539], was significant $t(37)= - 3.810$, $p< .001$, $d= 1.28$. Participants in the treatment condition had lower scores on the RRS (M= 1.79, SE= .13), than those in the control condition (M= 2.27, SE= .14). This difference, -.477, 95% CI [-.889, -.065], was significant $t(38)= -2.345$, $p< .05$, $d= 0.69$. These results provide support for *Hypothesis* 5 and suggest that the treatment condition had significantly lower levels of rumination and worry compared to the control group.

Positive and Negative Affect

Participants in the treatment condition reported higher levels of PA (M= 3.36, SE= .24), than those in the control condition (M= 2.85, SE= .14). This difference, .511, 95% CI [-.013, 1.035], was not significant $t(40)= 1.971$, $p= .056$, $d= 0.75$. On average, participants in the treatment condition reported lower levels of NA (M= 1.64, SE= .11), than those in the control (M= 2.30, SE= .17). This difference, -.658, 95% CI [-1.096, -.219], was significant $t(41)=-3.033$, $p< .05$, $d= .79$. These results provide partial support for *Hypothesis 6* and suggest that the

treatment condition, overall, had significantly better levels of both positive and negative affect compared to the control condition.

Discussion

The goal of this study was to test the hypothesis that the core elements inherent in the typical 8-week, manualized mindfulness-based intervention (MBI) could be distilled into a less time- and practice-intensive version, while still producing the salutary effects demonstrated in previous research. In support of the research literature on MBIs and the main hypothesis, there were significant differences between the treatment and control group at T2 that did not exist at T1 across nearly all outcome measures. These findings provide tentative support for the efficacy of this limited MBI. This novel MBI differed from previous studies in the following ways: 1) the intervention was limited to 45-minutes, rather than 4 x 1.5 hour sessions or 8 x 2.5 hour sessions; 2) loving-kindness meditation was explicitly practiced, rather than three meditations (body scan, sitting meditation, and Hatha yoga) where loving-kindness is only implicitly practiced; and 3) participants were only required to practice a minimum of 75 minutes a week for six weeks, rather than 4-5 hours a week for eight weeks (5-6 x 45 minute sessions). Thus, this novel MBI required approximately 8-hours of time investment, rather than the 30-50 hours seen in MBIs like MBSR or MBCT.

While the results of this study provide support for the main research hypothesis, this raises the question: How comparable are the changes to those seen in the typical MBI? After participants underwent the novel MBI, the self-reported changes in mindfulness, worry, rumination, and decentring were comparable to those seen in other studies using the more intensive, manualized intervention of MBSR (e.g., Carmody & Baer, 2007; Carmody et al., 2009; Robins et al., 2012; Vøllestad, Sivertsen, & Nielsen, 2011). Furthermore, the changes in

positive and negative affect were comparable to those seen in a study where MBCT was taught to students (Collard, Avny, & Boniwell, 2008). Unfortunately, no studies could be located that used the SCS-SF or DASS outcome measures to make meaningful comparisons for self-compassion, depression, anxiety, and stress. Nevertheless, these findings are particularly salient because it suggests that this novel MBI was comparable to the typical MBI in significantly reducing participants' propensity to ruminate and worry, while significantly increasing their levels of mindfulness, self-compassion, and decentring. More importantly however, participants that underwent the MBI reported significantly lower levels of rumination and worry, which are two primary mechanisms implicated in the development and sustainment of depression and anxiety (e.g, McLaughlin & Nolen-Hoeksema, 2011; Nolen-Hoeksema, 1991).

While the changes between pre- and post-intervention measures for the treatment group were significant, there is still the question of how meaningful the changes actually are. Of particular interest, for reasons already discussed, are the outcome variables of depression, anxiety, stress, rumination, and worry. Zlmoke's (2009) normative data for American undergraduates (N=1138) for the DASS sub-scales report the following mean scores: DASS Depression = 8.50, DASS Anxiety = 7.79, and DASS Stress = 12.18. In the present study, at T2 the treatment group's raw scores on the DASS sub-scales were as follows (T1 raw means reported in brackets): DASS Depression = 4.23 (12.47), DASS Anxiety = 4.41 (10.47), and DASS Stress = 7.37 (15.68). Based on the cut-offs reported by Lovibond and Lovibond (1995), participants that underwent the MBI used in this study saw, on average, a change from mild levels to normal levels of depression, anxiety, and stress. In the same study, Zlmoke reports that the mean score for worry, measured with the PSWQ, was 62.60 (SD= 12.31). In the present study, the treatment group's mean raw score at T1 for the PSWQ = 55.89 (SD= 14.45), while at

T2 the treatment group's mean raw score for the PSWQ = 43.82 (SD= 15.62). To put this into perspective, Gillis, Haaga, and Ford (1995) report that in their community sample (*n*=244), scores in the 80th percentile for the PSWQ were around 53, whereas scores in the 50th percentile were around 44. No comparable normative data or cut-off values for rumination could be found. Nevertheless, these results would suggest that the novel MBI used in the present study was able to produce meaningful changes in the predicted outcome measures. In conjunction with the comparable changes seen in mindfulness, self-compassion, and decentring this provides further support for the efficacy of the MBI used in the present study.

The meditation used in this study, loving-kindness meditation (LKM), has received limited interest in the research literature compared to the more traditional forms of single-field and open-field meditations. Therefore, a second goal of this study was to extend findings of previous research (e.g., Carmody & Baer, 2007) of the relationship between mindfulness practice time and levels of mindfulness, self-compassion, depression, anxiety, and stress. Between T1 and T2 (6 weeks apart) participants' that underwent the MBI reported significantly increased levels of self-compassion and mindfulness compared to the control condition. Furthermore, the average time participants' spent meditating for the study period was approximately 5 hours (expected minimum was 7.5 hours). Unfortunately, due to concerns of statistical power I was precluded from exploring this hypothesis in the current study. Thus, no support could be found for the secondary hypothesis that time spent practicing LKM would be associated with changes in the outcome measures. Nevertheless, there are some indications as to the efficacy of the LKM used in this study. LKM is meant to teach its practitioners to be aware of their personal experience, to be non-judgmental of both themselves and others, and to avoid needlessly reacting to negative inner experiences. The significant changes for the treatment group at T2 for the FFMQ

Awareness, Non-judgment, and Non-reactivity sub-scales, along with the significant changes in levels of self-compassion provide some support for the efficacy of the LKM used in this study.

Limitations and Future Directions. There are a number of potential limitations for the present study. First, research on mindfulness and MBIs typically rely on self-reported levels of mindfulness and any outcome measures used. While research into mindfulness and MBIs is diversifying and starting to rely on a wider variety of measures to converge on how mindfulness and MBIs may work, these measures have their own challenges. For instance, fMRI has been one measure that is quickly being adopted in the study of mindfulness. However, it is important to remember that fMRI is based on the assumption that increased blood-oxygen levels to an area represent increased activity for the cognitive process being studied (displayed as statistical averages across voxels). The issue here is that increased levels of activity may not actually reflect increased levels of performance and thus may be interpreted incorrectly. There is some preliminary evidence in support of this conclusion, which suggests that as people become expert meditators they may see lowered levels of activation compared to novice meditators (e.g., Brefczynski-Lewis et al., 2007). Therefore, it is important for future studies to rely not just on self-report data or just one form of measurement, but to also implement the use of physiological, neurological, and behavioural measures to strengthen the validity of findings into how mindfulness and MBIs may work. The lack of any behavioural measures to supplement the self-report data is one of the bigger limitations for the present study; nevertheless, due to the nature and scope of this study, I was limited to only using self-report measures.

A second limitation to the present study was the use of a wait-list control group, in lieu of an active control group, or both an active and passive control group. Research suggests (e.g., Jain et al., 2007) that when MBIs are compared to active controls, such as relaxation training,

comparable outcomes on measures of distress and positive affect are found. However, these same studies often support that mindfulness is producing specific changes, such as a reduction in rumination or distractive thoughts. However, the present study's goal and purpose was to determine if a limited MBI would still produce the salutary effects seen in the formal MBI. In other words, because the nature of this study was exploratory, comparing this novel MBI to an active control group would have been premature. Therefore, now that tentative support for the efficacy of the novel MBI used in this study has been demonstrated, future studies using this MBI should include an active control condition to strengthen the internal validity of the study.

A third limitation is related to the sample size, retention rate, and compliance with the treatment condition. The study initially started with 44 participants agreeing to attend the treatment condition's intervention, 38 received the intervention, and by the end of the study 19 participants remained. This reflects an 86% retention rate at T1, but only a 50% retention rate at T2. However, because an online survey was used after T1 perhaps the low retention rate, at least with regards to the outcome measures, is related to the method used. Finally, concerns over compliance with the treatment condition are warranted because the minimum practice time that participants were asked to complete for the study was 7.5 hours over 6 weeks; however, the average practice was time was approximately 5 hours (SD= 4.6 hours). This reflects a large variation in participant's complying with the treatment condition. As a result it is possible that perhaps the participants who actually practiced the meditation differ in some way from those that underwent the intervention, but did not comply with the meditation component. Thus, future research should try to incorporate a way to determine why participants did or did not practice the meditation, such as the use of semi-structured interviews.

Due to concerns over compliance this raises three questions that should be addressed in

future research. First, after the study period concludes are participants still practicing the meditation? Second, are the changes in key outcome measures sustained? Third, is the practice quality improving as time goes on and is the practice quality related to changes in outcome measures? Unfortunately the nature of this research project prevented post-intervention follow-up on a longer time scale, such as 6-months and 12-months. As for the third question, while the present study did include a rudimentary measure of practice quality, to examine any changes in practice quality was not possible because it was not possible to explore the relationship between practice time and the outcome measures. Thus, future research should incorporate a validated measure of practice quality (e.g., Del Re, Flückiger, Goldberg, & Hoyt, 2013) to address this question, in addition to enhancing the internal validity of the research.

Finally, another concern is related to the family-wise error rate due to the number of *t*-tests used in the present study. The present study used 14 *t*-tests during the data analysis stage. Using Bonferroni's correction, an alpha value of .004 should have been used to lower the Type I error rate. However, due to the exploratory nature of this study an alpha value of .05 was used for data analysis. Nevertheless, an examination of the data with an alpha value of .004 revealed no major changes on the outcome measures of depression, anxiety, stress, decentring, FFMQ Non-reactivity, worry, or negative affect. With only positive affect, rumination, self-compassion, and the four other sub-scales of the FFMQ failing to meet this conservative alpha value. Future research should take precautions to limit the number of *t*-tests used to address the concern of family-wise error rate by carefully choosing the best outcome measures to examine. For instance, the Difficulties In Emotion Regulation Scale could be used to measure emotion regulation rather than examining global measures of affect, worry, and rumination. This would reduce the number of *t*-tests used during data analysis, while also providing a more accurate overview of

participants' emotion regulation capabilities. Furthermore, due to the exploratory nature of this study it may have made more sense to examine participants' total score on the FFMQ rather than their sub-scale scores. This is because the present study was only interested in exploring changes in overall mindfulness, rather than changes in specific sub-scales of mindfulness. In this case the total score for mindfulness was well within the corrected alpha value cut-off of .004.

With preliminary support for the efficacy of this novel MBI, and in light of the above limitations, a number of future studies need to be conducted to strengthen the hypothesis that the salutary benefits of mindfulness can manifest in less time invested compared to the typical MBI. First, a follow-up study should be conducted to determine if practicing LKM is indeed associated with changes in the psychological constructs associated with mindfulness. Second, a follow-up study should expand this MBI to include a body scan and focused breathing (or sitting meditation) component, while retaining the 45-minute session on the theory of mindfulness. This will allow for participant's who undergo the MBI to have a choice in the meditations they practice and perhaps increase compliance rates. Furthermore, as discussed in the literature review, practicing different forms of meditation is associated with different outcomes. Thus, the inclusion of a single-field, open-field, and loving-kindness meditation should, in theory, produce larger impacts on mental health and well-being. Furthermore, future studies should begin to compare limited MBI's with active-control conditions like relaxation training or the health enhancement program (MacCoon, Imel, Rosenkranz, Sheftel, et al., 2012). Finally, a future study should attempt to compare a limited MBI to MBSR to gauge what, if any, differences manifest in post-intervention measures related to mindfulness, self-compassion, emotion regulation, mental health, and mental well-being.

Conclusion

The age of onset for most mental health disorders is in the age-range of the average university student; furthermore, the number of students attending post-secondary education is on the rise. Thus, the ability to reduce two major risk factors (e.g., rumination and worry), while increasing students' protective factors (e.g., mindfulness, etc.,), for depression and anxiety are of utmost importance to alleviate the demand placed on campus mental health services. This is particularly important for smaller campuses where the services provided are generally under-funded and under-resourced. Because this novel MBI was able to effectively produce similar outcomes to those seen in more intensive MBIs (in addition to costing nothing), there is a real potential for the widespread deployment and use of limited MBIs on university campuses in an attempt to make tangible improvements in students' mental health. However, there is a paucity of research literature on limited MBIs despite evidence to support the efficacy of such programs and calls for more research into these interventions (Carmody & Baer, 2009). As such, no firm conclusions can be drawn about the effectiveness of implementing a limited MBI into the continuum of mental healthcare offered by universities. The current study adds to the small body of research on limited MBIs in an effort to better understand the components of mindfulness and MBIs necessary to produce positive outcomes in students' mental health. As always more research needs to be conducted. With the suggestions for future studies to be conducted on limited MBIs it is my hope that within the next 3-5 years we can begin to see the use of MBIs on university campuses as an effective primary and secondary preventative measure for mental health disorders.

References

Amstadter, A. (2008). Emotion regulation and anxiety disorders. *Journal Of Anxiety Disorders*, *22*(2), 211-221.

Association of Universites and Colleges of Canada. (2010, November). *Value of a degree in Canada's labor market.* Retrieved from http://www.aucc.ca/wp-content/uploads/2011/05/value-labour-market.pdf

Baer, R. A. (2003). Mindfulness training as a clinical intervention: A conceptual and empirical review. *Clinical Psychology: Science And Practice, 10*(2), 125-143.

Baer, R. A. (2009). Self-focused attention and mechanisms of change in mindfulness-based treatment. *Cognitive Behaviour Therapy, 38*(S1), 15-20. doi:10.1080/16506070902980703

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using Self-Report Assessment Methods to Explore Facets of Mindfulness. *Assessment, 13*(1), 27-45. doi:10.1177/1073191105283504

Banich, M., & Compton, R. (2011). Emotion and social cognition. In M. Banich & R. Compton (Eds.), *Cognitive Neuroscience* (pp. 365-394). Belmont, CA: Wadsworth

Barnard, L. K., & Curry, J. F. (2011). Self-compassion: Conceptualizations, correlates, & interventions. *Review Of General Psychology, 15*(4), 289-303. doi:10.1037/a0025754

Beautrais, A. L. (2000). Risk factors for suicide and attempted suicide among young people. *Australian And New Zealand Journal Of Psychiatry*, *34*(3), 420-436.

Benson, H., Beary, J. F., & Carol, M. P. (1974). The relaxation response. *Psychiatry: Journal for the Study of Interpersonal Processes, 37*(1), 37-46

Benson, H. (1993). The relaxation response. In D. Goleman & J. Gurin (Eds.), *Mind body medicine how to use your mind for better health* (pp. 125-149). Consumer Reports Books.

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., & ... Devins, G. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science And Practice*, *11*(3), 230-241. doi:10.1093/clipsy.bph077

Brefczynski-Lewis, J., Levinson, D., Davidson, R., Lutz, A., & Schaefer, H. (2007). Neural correlates of attentional expertise in long-term meditation practitioners. *Proceedings Of The National Academy Of Sciences Of The United States Of America*, *104*(27), 11483-11488.

Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry, 18*(4), 211-237. doi:10.1080/10478400701598298

Cahn, B. R., & Polich, J. (2006). Meditation States and Traits: EEG, ERP, and Neuroimaging Studies. *Psychological Bulletin*, *132*(2), 180-211. doi:10.1037/0033-2909.132.2.180

Carmody, J. (2009). Evolving Conceptions of Mindfulness in Clinical Settings. Journal Of Cognitive Psychotherapy, 23(3), 270-280. doi:10.1891/0889-8391.23.3.270

Carmody, J., & Baer, R. A. (2007). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *Journal Of Behavioral Medicine, 31*(1), 23-33. doi:10.1007/s10865-007-9130-7

Carmody, J., Baer, R. A., Lykins, E. B., & Olendzki, N. (2009). An empirical study of the mechanisms of mindfulness in a mindfulness-based stress reduction program. *Journal Of Clinical Psychology, 65*(6), 613-626. doi:10.1002/jclp.20579

Centre of Clinical Interventions. (2014). "What Is Mindfulness?" *Centre of Clinical Interventions*. Last Accessed April 13th 2015. http://www.cci.health.wa.gov.au/docs/ACF3C5B.pdf

Center for Collegiate Mental Health. (2014, January). *2013 annual report* (Publication No. STA 14-43). Retrieved from http://sites.psu.edu/ccmh/wp-content/uploads/sites/3058/2014/05/2013_CCMH_Report1.pdf

Chambers, R., Gullone, E., & Allen, N. B. (2009). Mindful emotion regulation: An integrative review. *Clinical Psychology Review, 29*(6), 560-572. doi:10.1016/j.cpr.2009.06.005

Chiesa, A., & Serretti, A. (2009). Mindfulness-Based Stress Reduction for Stress Management in Healthy People: A Review and Meta-Analysis. *The Journal Of Alternative & Complementary Medicine*, *15*(5), 593-600.

Coffey, K. A., & Hartman, M. (2008). Mechanisms of action in the inverse relationship between mindfulness and psychological distress. *Complementary Health Practice Review*, *13*(2), 79-91.

Coffey, K. A., Hartman, M., & Fredrickson, B. L. (2010). Deconstructing mindfulness and constructing mental health: understanding mindfulness and its mechanisms of action. *Mindfulness, 1(*4), 235-253. doi: 10.1007/s12671-010-0033-2

Collard, P., Avny, N., & Boniwell, I. (2008). Teaching Mindfulness Based Cognitive Therapy (MBCT) to students: The effects of MBCT on the levels of Mindfulness and Subjective Well-Being. *Counselling Psychology Quarterly*, *21*(4), 323-336. doi:10.1080/09515070802602112

Craig, A. (. (2003). Interoception: The sense of the physiological condition of the body. *Current Opinion In Neurobiology, 13*(4), 500-505. doi:10.1016/S0959-4388(03)00090-4

Creswell, J. D., Way, B. M., Eisenberger, N. I., & Lieberman, M. D. (2007). Neural correlates of dispositional mindfulness during affect labeling. *Psychosomatic Medicine, 69(*6), 560-565. doi:10.1097/PSY.0b013e3180f6171f

Critchley, H. D., Wiens, S., Rotshtein, P., Öhman, A., & Dolan, R. J. (2004). Neural systems supporting interoceptive awareness. *Nature Neuroscience*, *7*(2), 189-195.

Cullen, M. (2011). Mindfulness-based interventions: An emerging phenomenon. *Mindfulness*, *2*(3), 186-193. doi:10.1007/s12671-011-0058-1

Damasio, A.R. (1999). The feeling of what happens: Body and emotion in the making of consciousness. New York, NY: Harcourt Brace.

Davis, L., & Kurzban, S. (2012). Mindfulness-based treatment for people with severe mental illness: a literature review. *American Journal of Psychiatric Rehabilitation, 15*(2), 202-232.

del Re, A. C., Flückiger, C., Goldberg, S. B., & Hoyt, W. T. (2013). Monitoring mindfulness practice quality: An important consideration in mindfulness practice. *Psychotherapy Research*, *23*(1), 54-66. doi:10.1080/10503307.2012.729275

Fan, J., McCandliss, B. D., Sommer, T., Raz, A., & Posner, M. I. (2002). Testing the efficiency and independence of attentional networks. *Journal of cognitive neuroscience*, *14*(3), 340-347.

Farb, N. A., Anderson, A. K., & Segal, Z. V. (2012). The mindful brain and emotion regulation in mood disorders. *Canadian journal of psychiatry. Revue canadienne de psychiatrie, 57*(2), 70.

Farb, N. S., Anderson, A. K., Mayberg, H., Bean, J., McKeon, D., & Segal, Z. V. (2010). Minding one's emotions: Mindfulness training alters the neural expression of sadness. *Emotion, 10*(1), 25-33. doi:10.1037/a0017151

Farb, N. S., Segal, Z. V., Mayberg, H., Bean, J., McKeon, D., Fatima, Z., & Anderson, A. K. (2007). Attending to the present: mindfulness meditation reveals distinct neural modes of self-reference. *Social Cognitive & Affective Neuroscience, 2*(4), 313-322. doi:10.1093/scan/nsm030

Flatt, A. K. (2013). A Suffering Generation: Six factors contributing to the mental health crisis in North American higher education. *College Quarterly*, *16*(1), 1.

Fresco, D. M., Moore, M. T., van Dulmen, M. M., Segal, Z. V., Ma, S. H., Teasdale, J. D., & Williams, J. G. (2007). Initial Psychometric Properties of the Experiences Questionnaire: Validation of a Self-Report Measure of Decentering. *Behavior Therapy, 38*(3), 234-246.

Gardner, F., Moore, Z., & Marks, D. (2014). Rectifying Misconceptions: A Comprehensive Response to "Some Concerns About the Psychological Implications of Mindfulness: A Critical Analysis". *Journal Of Rational-Emotive & Cognitive-Behavior Therapy*, *32*(4), 325-344.

Germer, C. K., & Neff, K. D. (2013). Self-Compassion in Clinical Practice. *Journal Of Clinical Psychology*, *69*(8), 856-867. doi:10.1002/jclp.22021

Germer, C. K., & Siegel, R. D. (Eds.). (2012). Wisdom and compassion in Psychotherapy: Deepening mindfulness in clinical practice. New York: Guilford Press.

Gillis, M. M., Haaga, D. F., & Ford, G. T. (1995). Normative values for the Beck Anxiety Inventory, Fear Questionnaire, Penn State Worry Questionnaire, and Social Phobia and

Anxiety Inventory. *Psychological Assessment*, *7*(4), 450-455. doi:10.1037/1040-3590.7.4.450

Goleman, D. (1971). Meditation as meta-therapy: Hypotheses toward a proposed fifth state of consciousness. *Journal Of Transpersonal Psychology*, *3*(1), 1-25.

Goleman, D. J., & Schwartz, G. E. (1976). Meditation as an intervention in stress reactivity. *Journal of Consulting and Clinical Psychology, 44*(3), 456.

Gonzalez, R., Nolen-Hoeksema, S., & Treynor, W. (2003). Rumination Reconsidered: A Psychometric Analysis. *Cognitive Therapy & Research, 27*(3), 247-259.

Gotlib, I. H., & Joormann, J. (2010). Cognition and Depression: Current Status and Future Directions. *Annual Review Of Clinical Psychology*, *6*(1), 285-312.

Grabovac, A. D., Lau, M. A., & Willett, B. R. (2011). Mechanisms of mindfulness: A Buddhist psychological model. *Mindfulness*, *2*(3), 154-166. doi:10.1007/s12671-011-0054-5

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment, 26*(1), 41-54. doi: 10.1023/B:JOBA.0000007455.08539.94

Gross, J. J. (1998a). The emerging field of emotion regulation: An integrative review. *Review Of General Psychology*, *2*(3), 271-299. doi:10.1037/1089-2680.2.3.271

Gross, J. J. (1998b). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal Of Personality And Social Psychology, 74*(1), 224-237. doi:10.1037/0022-3514.74.1.224

Gross, J. J., & John, O. P. (2003). Individual Differences in Two Emotion Regulation Processes: Implications for Affect, Relationships, and Well-Being. *Journal Of Personality & Social Psychology*, *85*(2), 348-362. doi:10.1037/0022-3514.85.2.348

Gross, J. J., & Muñoz, R. F. (1995). Emotion regulation and mental health. *Clinical Psychology: Science And Practice, 2(*2), 151-164. doi:10.1111/j.1468-2850.1995.tb00036.x

Grossman, P. (2010). Mindfulness for psychologists: Paying kind attention to the perceptible. *Mindfulness*, *1*(2), 87-97. doi:10.1007/s12671-010-0012-7

Grossman, P., Niemann, L., Schmidt, S., & Walach, H. (2004). Mindfulness-based stress reduction and health benefits A meta-analysis. *Journal Of Psychosomatic Research*, *57*(1), 35-43.

Gunaratana, B., & Gunaratana, H. (2011). *Mindfulness in plain English*. Wisdom Publications Inc.

Hayes, S. C. (2004a). Acceptance and Commitment Therapy, Relational Frame Theory, and the Third Wave of Behavioral and Cognitive Therapies. *Behavior Therapy, 35*(4), 639-665. doi:10.1016/S0005-7894(04)80013-3

Hayes, S. C. (2004b). Acceptance and commitment therapy and the new behaviour therapies: Mindfulness, acceptance, and relationships. In S. C. Hayes, V. M. Follette, & M. M. Linehan (Eds.), *Mindfulness and acceptance: Expanding the cognitive-behavioural tradition.* New York: Guilford Press.

Hergenhahn, B. (2009). Functionalism. In B. Hergenhahn (Ed.), *An introduction to the history of psychology* (pp. 334-383). Belmont, CA: Wadsworth.

Heeren, A., Van Broeck, N., & Philippot, P. (2009). The effects of mindfulness on executive processes and autobiographical memory specificity. *Behaviour Research And Therapy, 47*(5), 403-409. doi:10.1016/j.brat.2009.01.017

Hölzel, B. K., Lazar, S. W., Gard, T., Schuman-Olivier, Z., Vago, D. R., & Ott, U. (2011). How does mindfulness meditation work? Proposing mechanisms of action from a conceptual and neural perspective. *Perspectives On Psychological Science*, *6*(6), 537-559. doi:10.1177/1745691611419671

Hölzel, B. K., Carmody, J., Vangel, M., Congleton, C., Yerramsetti, S. M., Gard, T., & Lazar, S. W. (2011). Mindfulness practice leads to increases in regional brain gray matter density. *Psychiatry Research: Neuroimaging, 191*(1), 36-43. doi:10.1016/j.pscychresns.2010.08.006

Hollis-Walker, L., & Colosimo, K. (2011). Mindfulness, self-compassion, and happiness in non-meditators: A theoretical and empirical examination. *Personality And Individual Differences, 50*(2), 222-227. doi:10.1016/j.paid.2010.09.033

Hofmann, S. G., Grossman, P., & Hinton, D. E. (2011). Loving-kindness and compassion meditation: Potential for psychological interventions. *Clinical psychology review, 31*(7), 1126-1132. doi:10.1016/j.cpr.2011.07.003

IBM Corp. (2013). IBM SPSS Statistics for Mac OS X, Version 22.0.0.1 Armonk, NY: IBM Corp.

Jain, S., Shapiro, S. L., Swanick, S., Roesch, S. C., Mills, P. J., Bell, I., & Schwartz, G. R. (2007). A randomized controlled trial of mindfulness meditation versus relaxation training: effects on distress, positive states of mind, rumination, and distraction. *Annals Of Behavioral Medicine, 33*(1), 11-21. doi:10.1207/s15324796abm3301_2

Kabat-Zinn, J. (1982). An outpatient program in behavioural medicine for chronic pain patients based on the practice of mindfulness meditation: theoretical considerations and preliminary results. *General Hospital Psychiatry*, *4*(1), 33-47.

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: past, present, and future. *Clinical Psychology: Science & Practice, 10*(2), 144-156.

Kabat-Zinn, J., Lipworth, L., & Burney, R. (1985). The clinical use of mindfulness meditation for the self-regulation of chronic pain. *Journal Of Behavioral Medicine*, *8*(2), 163-190.

Karoly, P. (1993). Mechanisms of self-regulation: A systems view. *Annual Review Of Psychology, 44*(1), 23.

Kazdin, A. E. (2007). Mediators and Mechanisms of Change in Psychotherapy Research. *Annual Review Of Clinical Psychology*, *3*(1), 1-27.

Keng, S., Smoski, M. J., Robins, C. J., Ekblad, A. G., & Brantley, J. G. (2012). Mechanisms of change in mindfulness-based stress reduction: Self-compassion and mindfulness as mediators of intervention outcomes. *Journal Of Cognitive Psychotherapy, 26*(3), 270-280. doi:10.1891/0889-8391.26.3.270

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime Prevalence and Age-of-Onset Distributions of DSM-IV Disorders in the National Comorbidity Survey Replication. *Archives Of General Psychiatry*, *62*(6), 593-602. doi:10.1001/archpsyc.62.6.593

Keyes, C. M. (2005). Mental Illness and/or Mental Health? Investigating Axioms of the Complete State Model of Health. *Journal Of Consulting And Clinical Psychology, 73*(3), 539-548. doi:10.1037/0022-006X.73.3.539

Kuyken, W., Byford, S., Taylor, R. S., Watkins, E., Holden, E., White, K., & ... Teasdale, J. D. (2008). Mindfulness-based cognitive therapy to prevent relapse in recurrent depression. *Journal Of Consulting And Clinical Psychology*, *76*(6), 966-978. doi:10.1037/a0013786

Kuyken, W., Watkins, E., Holden, E., White, K., Taylor, R. S., Byford, S., & ... Dalgleish, T. (2010). How does mindfulness-based cognitive therapy work?. *Behaviour Research And Therapy*, *48*(11), 1105-1112.

Lang, P. J. (1994). The varieties of emotional experience: A meditation on James-Lange theory. *Psychological Review*, *101*(2), 211.

Lazar, S. W., Kerr, C. E., Wasserman, R. H., Gray, J. R., Greve, D. N., Treadway, M. T., & ... Fischl, B. (2005). Meditation experience is associated with increased cortical thickness. *Neuroreport: For Rapid Communication Of Neuroscience Research*, *16*(17), 1893-1897. doi:10.1097/01.wnr.0000186598.66243.19

Linehan, M. M., Heard, H. L., & Armstrong, H. E. (1993). Naturalistic follow-up of a behavioral treatment for chronically parasuicidal borderline patients. *Archives Of General Psychiatry*, *50*(12), 971-974. doi:10.1001/archpsyc.1993.01820240055007

Linehan, M. M., Armstrong, H. E., Suarez, A., Allmon, D., & Heard, H. L. (1991). Cognitive-behavioral treatment of chronically parasuicidal borderline patients. *Archives Of General Psychiatry, 48*(12), 1060-1064. doi:10.1001/archpsyc.1991.01810360024003

Lovibond, S. H., & Lovibond, P. F. (1995). Manual for the Depression Anxiety Stress Scales. (2nd Ed) Sydney: Psychology Foundation.

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression

and Anxiety Inventories. *Behaviour Research And Therapy, 33*(3), 335-343. doi:10.1016/0005-7967(94)00075-U

Lutz, A., Slagter, H. A., Dunne, J. D., & Davidson, R. J. (2008). Attention regulation and monitoring in meditation. *Trends In Cognitive Sciences*, *12*(4), 163-169.

Lynch, T. R., Chapman, A. L., Rosenthal, M. Z., Kuo, J. R., & Linehan, M. M. (2006). Mechanisms of change in dialectical behavior therapy: Theoretical and empirical observations. *Journal Of Clinical Psychology*, *62*(4), 459-480. doi:10.1002/jclp.20243

Ma, S. H., & Teasdale, J. D. (2004). Mindfulness-Based Cognitive Therapy for Depression: Replication and Exploration of Differential Relapse Prevention Effects. *Journal Of Consulting And Clinical Psychology*, *72*(1), 31-40. doi:10.1037/0022-006X.72.1.31

MacCoon, D. G., Imel, Z. E., Rosenkranz, M. A., Sheftel, J. G., Weng, H. Y., Sullivan, J. C., & ... Lutz, A. (2012). The validation of an active control intervention for Mindfulness Based Stress Reduction (MBSR). *Behaviour Research And Therapy*, *50*(1), 3-12. doi:10.1016/j.brat.2011.10.011

Mehling, W. E., Gopisetty, V., Daubenmier, J., Price, C. J., Hecht, F. M., & Stewart, A. (2009). Body awareness: construct and self-report measures. *Plos One*, *4*(5), e5614. doi:10.1371/journal.pone.0005614

Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn State Worry Questionnaire. *Behaviour Research And Therapy, 28*(6), 487-495. doi:10.1016/0005-7967(90)90135-6

McLaughlin, K. A., & Nolen-Hoeksema, S. (2011). Rumination as a transdiagnostic factor in depression and anxiety. *Behaviour Research And Therapy*, *49*(3), 186-193.

Modinos, G., Ormel, J., & Aleman, A. (2010). Individual differences in dispositional mindfulness and brain activity involved in reappraisal of emotion. *Social Cognitive & Affective Neuroscience, 5*(4), 369-377. doi:10.1093/scan/nsq006

Mori, S., & Zhang, J. (2006). Principles of diffusion tensor imaging and its applications to basic neuroscience research. *Neuron (Science Direct)*, *51*(5), 527-539.

Neff, K. (2003a). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self And Identity, 2*(2), 85-101. doi: 10.1080/15298860309032

Neff, K. (2003b). The development and validation of a scale to measure self-compassion. *Self And Identity, 2*(3), 223.

Neff, K. D., & Germer, C. K. (2013). A pilot study and randomized controlled trial of the mindful self-compassion program. *Journal Of Clinical Psychology*, *69*(1), 28-44. doi:10.1002/jclp.21923

Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal Of Abnormal Psychology*, *100*(4), 569-582. doi:10.1037/0021-843X.100.4.569

Nolen-Hoeksema, S. (2000). The role of rumination in depressive disorders and mixed anxiety/depressive symptoms. *Journal Of Abnormal Psychology*, *109*(3), 504-511. doi:10.1037/0021-843X.109.3.504

Nolen-Hoeksema, S., Wisco, B., & Lyubomirsky, S. (2008). Rethinking rumination. *Perspectives On Psychological Science*, *3*(5), 400-424.

Ochsner, K. N., & Gross, J. J. (2005). The cognitive control of emotion. *Trends In Cognitive Sciences, 9*(5), 242-249.

Olendzki, A. (2009). Mindfulness and meditation. In F. Didonna (Ed.) *Clinical handbook of mindfulness* (pp. 37-44). New York: Springer

Posner, M. I., & Rothbart, M. K. (1992). Attentional mechanisms and conscious experience. In A. D. Milner, M. D. Rugg (Eds.) , *The neuropsychology of consciousness* (pp. 91-111). San Diego, CA, US: Academic Press.

Posner, M. I., Rothbart, M. K., Sheese, B. E., & Tang, Y. (2007). The anterior cingulate gyrus and the mechanism of self-regulation. Cognitive, Affective & Behavioral Neuroscience, 7(4), 391-395. doi:10.3758/CABN.7.4.391.

Raes, F., Pommier, E., Neff, K. D., & Van Gucht, D. (2011). Construction and factorial validation of a short form of the Self-Compassion Scale. *Clinical Psychology & Psychotherapy, 18*(3), 250-255. doi:10.1002/cpp.702

Radkovsky, A., McArdle, J. J., Bockting, C. H., & Berking, M. (2014). Successful emotion regulation skills application predicts subsequent reduction of symptom severity during treatment of major depressive disorder. *Journal Of Consulting And Clinical Psychology*, *82*(2), 248-262. doi:10.1037/a0035828

Reetz, D. R., Barr, V., & Krylowicz, B. (2013). *The association for university and college counselling center directors.* Retreived from The Association for University and College Counselling Centre Directors website: http://files.cmcglobal.com/AUCCCD_Monograph_Public_2013.pdf

Regehr, C., Glancy, D., & Pitts, A. (2013). Interventions to reduce stress in university students: A review and meta-analysis. *Journal Of Affective Disorders*, *148*(1), 1-11.

Rizvi, S. L., Steffel, L. M., & Carson-Wong, A. (2013). An overview of dialectical behavior therapy for professional psychologists. Professional Psychology: Research And Practice, 44(2), 73-80. doi:10.1037/a0029808

Roemer, L., & Orsillo, S. M. (2002). Expanding our conceptualization of and treatment for generalized anxiety disorder: Integrating mindfulness/acceptance-based approaches with existing cognitive-behavioral models. *Clinical Psychology: Science And Practice, 9*(1), 54-68. doi:10.1093/clipsy/9.1.54

Rottenberg, J., & Gross, J. J. (2003). When Emotion Goes Wrong: Realizing the Promise of Affective Science. *Clinical Psychology: Science And Practice*, *10*(2), 227-232.

Shapiro, S. L., Astin, J. A., Bishop, S. R., & Cordova, M. (2005). Mindfulness-Based Stress Reduction for Health Care Professionals: Results From a Randomized Trial. International Journal Of Stress Management, 12(2), 164-176. doi:10.1037/1072-5245.12.2.164

Shapiro, S. L., Brown, K. W., & Biegel, G. M. (2007). Teaching self-care to caregivers: Effects of mindfulness-based stress reduction on the mental health of therapists in training. *Training And Education In Professional Psychology, 1*(2), 105-115. doi:10.1037/1931-3918.1.2.105

Shapiro, S., Schwartz, G., & Bonner, G. (1998). Effects of Mindfulness-Based Stress Reduction on Medical and Premedical Students. *Journal Of Behavioral Medicine*, *21*(6), 581-599.

Sexton, C. E., Mackay, C. E., & Ebmeier, K. P. (2009). A systematic review of diffusion tensor imaging studies in affective disorders. *Biological Psychiatry*, *66*(9), 814-823. doi:10.1016/j.biopsych.2009.05.024

Siegel, R. D., Germer, C. K., & Olendzki, A. (2009). Mindfulness: what is it? where did it come from?. In F. Didonna (Ed.), *Clinical handbook of mindfulness* (pp. 17-35). New York, NY, US: Springer Science + Business Media. doi:10.1007/978-0-387-09593-6_2

Siegel, R. D. (2012). *The mindfulness solution: everyday practices for everyday problems*. New York: Guilford Press.

Sipe, W. B., & Eisendrath, S. J. (2012). Mindfulness-based cognitive therapy: theory and practice. *Canadian Journal Of Psychiatry*, *57*(2), 63-69.

Smith, J. C. (1975). Meditation as psychotherapy: A review of the literature. *Psychological Bulletin*, *82*(4), 558-564. doi:10.1037/h0076888

Speca, M., Carlson, L. E., Goodey, E., & Angen, M. (2000). A randomized, wait-list controlled clinical trial: the effect of a mindfulness meditation-based stress reduction program on mood and symptoms of stress in cancer outpatients. *Psychosomatic Medicine*, *62*(5), 613-622.

Storrie, K., Ahern, K., & Tuckett, A. (2010). A systematic review: students with mental health problems—a growing problem. *International Journal Of Nursing Practice*, *16*(1), 1-6.

Tang, Y., Lu, Q., Geng, X., Stein, E. A., Yang, Y., & Posner, M. I. (2010). Short-term meditation induces white matter changes in the anterior cingulate. *Proceedings Of The National Academy Of Sciences Of The United States Of America*, *107*(35), 15649-15652.

Tang, Y., Ma, Y., Wang, J., Fan, Y., Feng, S., Lu, Q., & ... Posner, M. I. (2007). Short-term meditation training improves attention and self-regulation. PNAS Proceedings Of The National Academy Of Sciences Of The United States Of America, 104(43), 17152-17156. doi:10.1073/pnas.0707678104

Teasdale, J. D., Segal, Z., & Williams, J. G. (1995). How does cognitive therapy prevent depressive relapse and why should attentional control (mindfulness) training help?. *Behaviour Research And Therapy, 33*(1), 25-39. doi:10.1016/0005-7967(94)E0011-7

Teasdale, J. D., Segal, Z. V., Williams, J. G., Ridgeway, V. A., Soulsby, J. M., & Lau, M. A. (2000). Prevention of relapse/recurrence in major depression by mindfulness-based cognitive therapy. *Journal Of Consulting And Clinical Psychology*, *68*(4), 615-623. doi:10.1037/0022-006X.68.4.615

Teasdale, J. D., Moore, R. G., Hayhurst, H., Pope, M., Williams, S., & Segal, Z. V. (2002). Metacognitive awareness and prevention of relapse in depression: Empirical evidence. *Journal Of Consulting And Clinical Psychology, 70*(2), 275-287. doi:10.1037/0022-006X.70.2.275

Van Dam, N. T., Sheppard, S. C., Forsyth, J. P., & Earleywine, M. (2011). Self-compassion is a better predictor than mindfulness of symptom severity and quality of life in mixed anxiety and depression. *Journal Of Anxiety Disorders*, *25*(1), 123-130.

Veen, V. v., & Carter, C. S. (2002). The anterior cingulate as a conflict monitor: fMRI and ERP studies. *Physiology & Behavior*, *77*(4-5), 477-482.

van Veen, V., Cohen, J. D., Botvinick, M. M., Stenger, V. A., & Carter, C. S. (2001). Anterior cingulate cortex, conflict monitoring, and levels of processing. *Neuroimage*, *14*(6), 1302-1308.

Verheul, R., Van Den Bosch, L. C., Koeter, M. J., De Ridder, M. J., Stijnen, T., & Van Den Brink, W. (2003). Dialectical behaviour therapy for women with borderline personality disorder: 12-month, randomised clinical trial in The Netherlands. *The British Journal Of Psychiatry: The Journal Of Mental Science*, *182*135-140.

Vøllestad, J., Sivertsen, B., & Nielsen, G. H. (2011). Mindfulness-based stress reduction for patients with anxiety disorders: Evaluation in a randomized controlled trial. *Behaviour Research And Therapy*, *49*(4), 281-288. doi:10.1016/j.brat.2011.01.007

Watson, D., & Clark, L. A. (1999). The PANAS-X: manual for the positive and negative affect schedule-expanded form. Retrieved from http://ir.uiowa.edu/cgi/viewcontent.cgi?article=1011&context=psychology_pubs

Zlomke, K. R. (2009). Psychometric properties of internet administered versions of Penn State Worry Questionnaire (PSWQ) and Depression, Anxiety, and Stress Scale (DASS). *Computers In Human Behavior*, *25*(4), 841-843. doi:10.1016/j.chb.2008.06.003

Appendix A

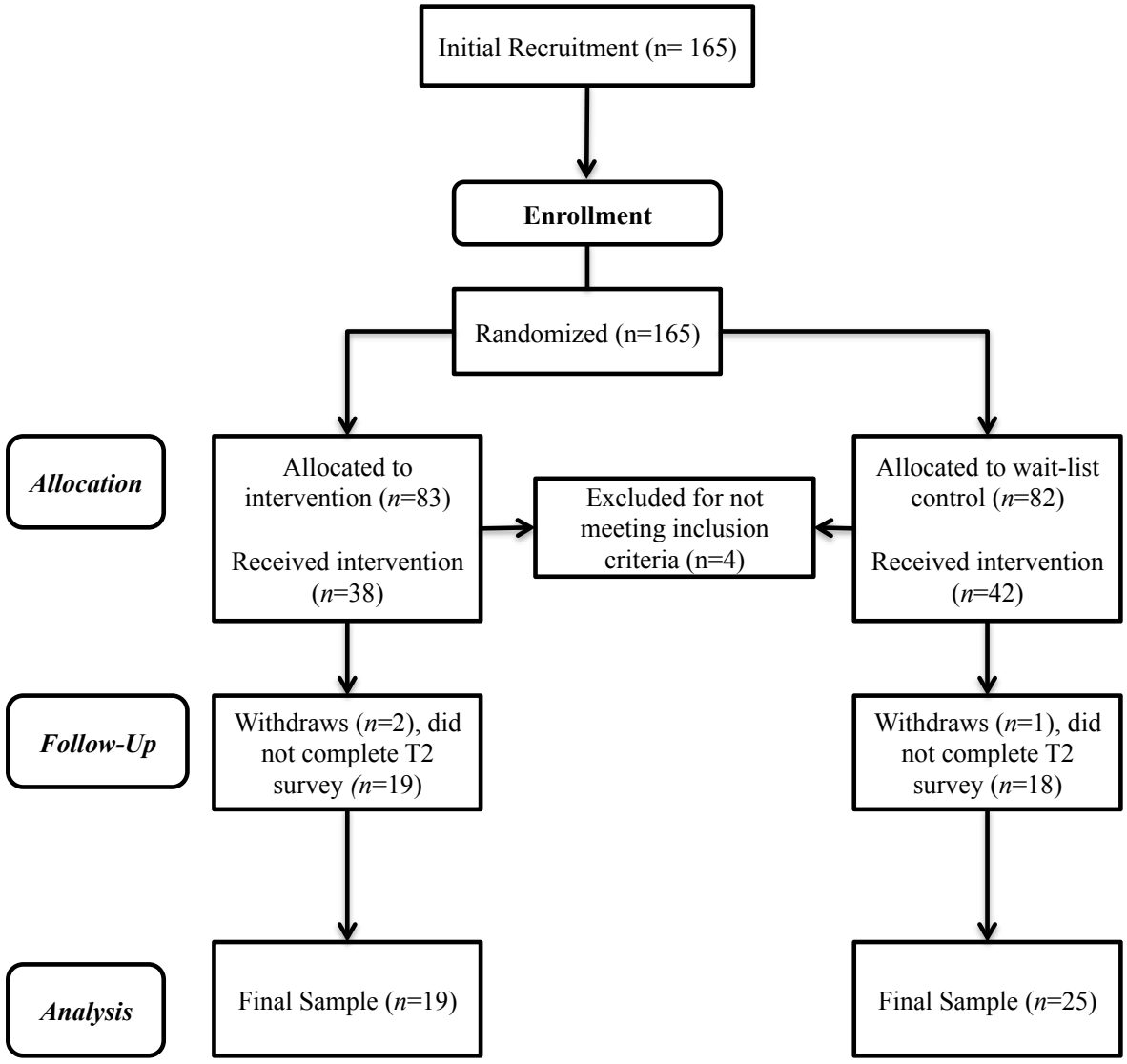


Figure 1. Flow of participants through research study. Three withdraws were due to time constraints, two exclusions were due to having received formal training in mindfulness, one exclusion was due to having meditated for 50+ hours at T1, and one exclusion was due to not being the age of majority.

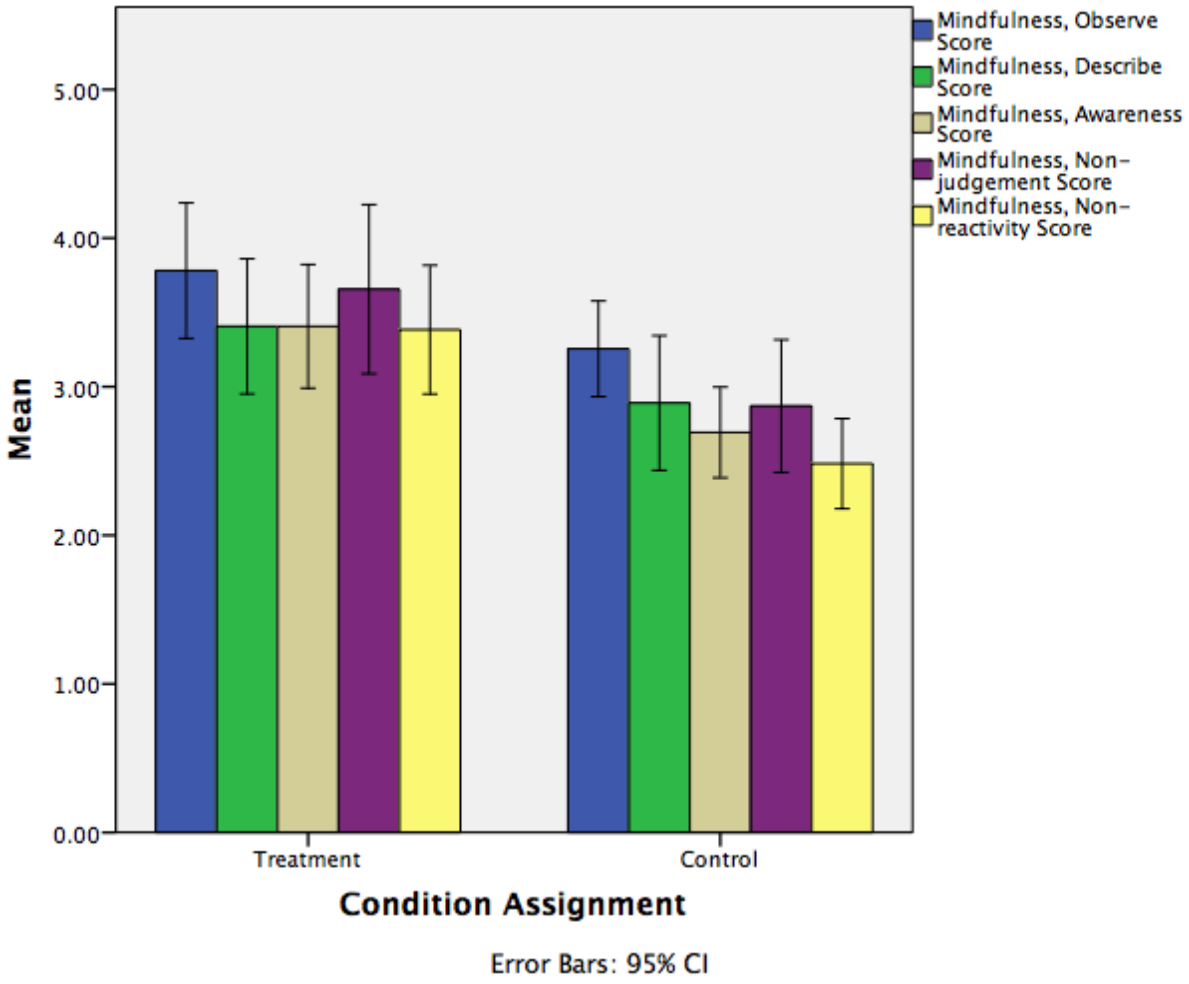


Figure 2. Mean scores on Five Factor Mindfulness Questionnaire sub-scales at T2 by Condition. Values reported are average values. Higher values reflect higher levels of mindfulness. Observe mean difference= .518, $t(42)= 2.163$, $p< .05$; Describe mean difference= .450, $t(40)= 1.405$, $p> .05$; Awareness mean difference= .518, $t(41)= 2.12$, $p= .040$; Non-Judgment mean difference= .842, $t(42)= 2.704$, $p= .010$; Non-Reactivity, mean difference= .931, $t(40)= 4.01$, $p < .0001$.

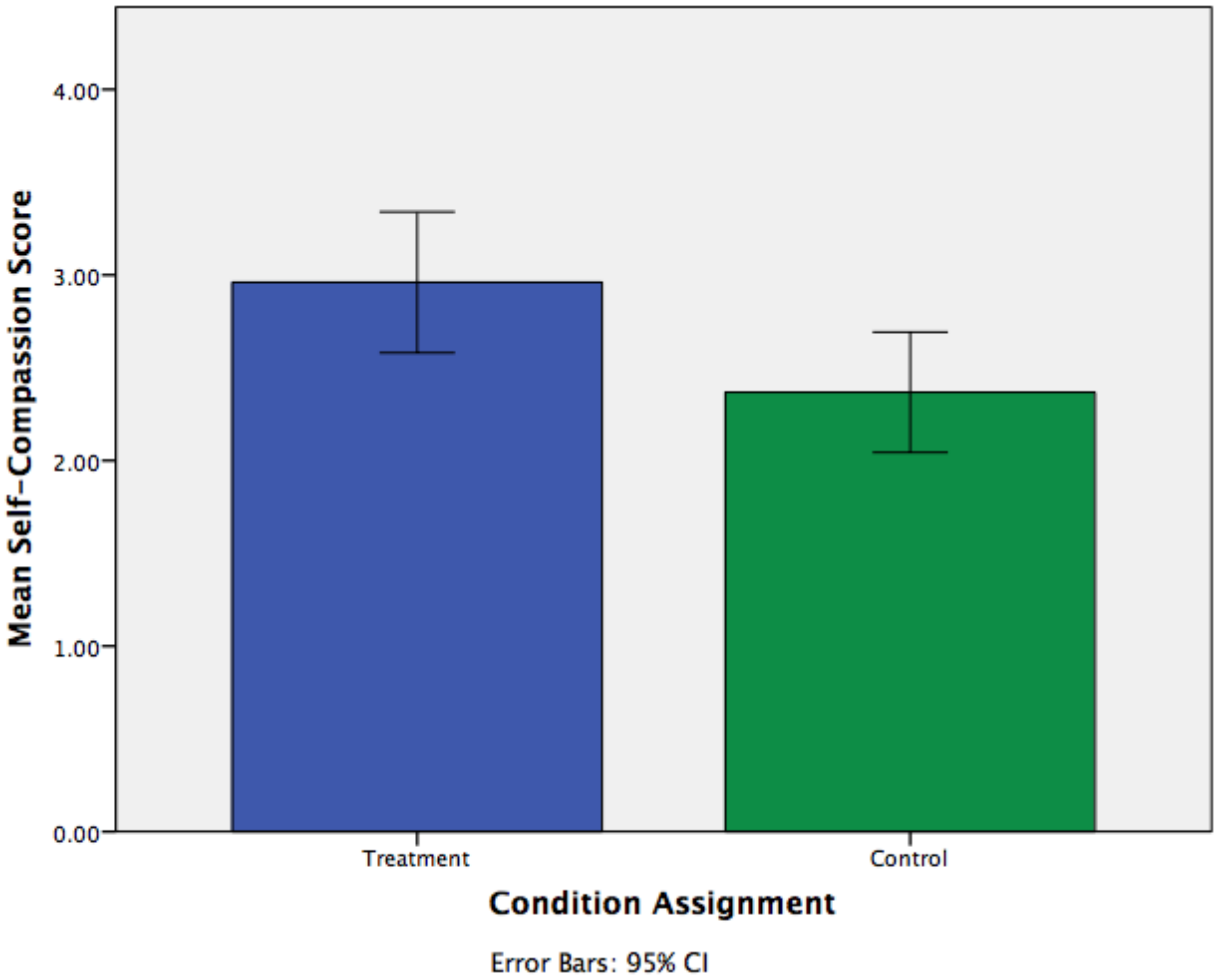


Figure 3. Mean score on Self-Compassion Scale-Short Form at T2 by Condition. Values reported are average values. Higher values reflect higher levels of self-compassion. Self-Compassion mean difference= .592, $t(41)= 2.484$, $p< .05$.

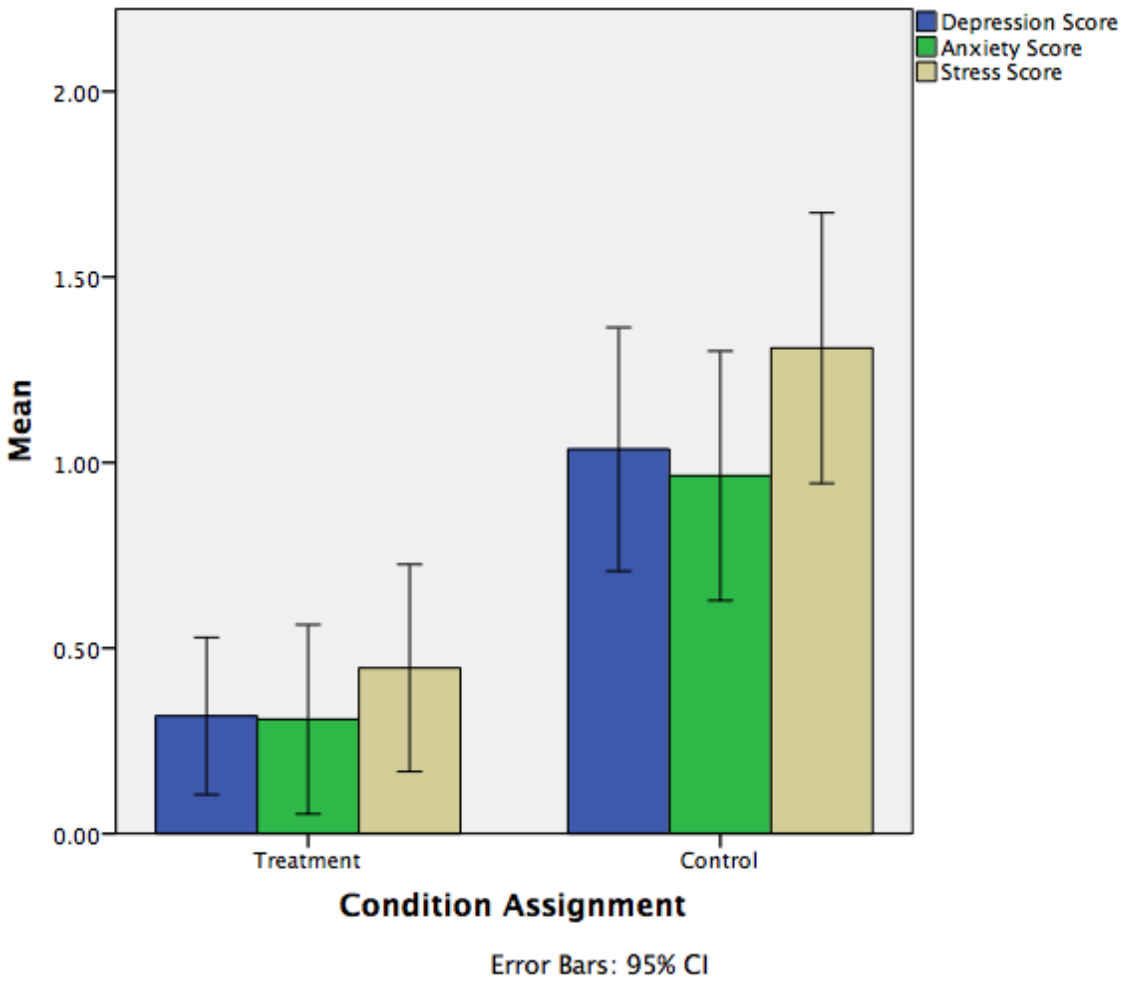


Figure 4. Mean scores on depression, anxiety, and stress by condition at T2. Values reported are average values. Lower values reflect lower levels of depression, anxiety, and stress. Depression mean difference= -.722, $t(35.143)= -4.051$, $p < .0001$; Anxiety mean difference= -.640, $t(39)= -3.195$, $p< .05$; Stress mean difference= .771, $t(42)= -3.654$, $p< .001$.

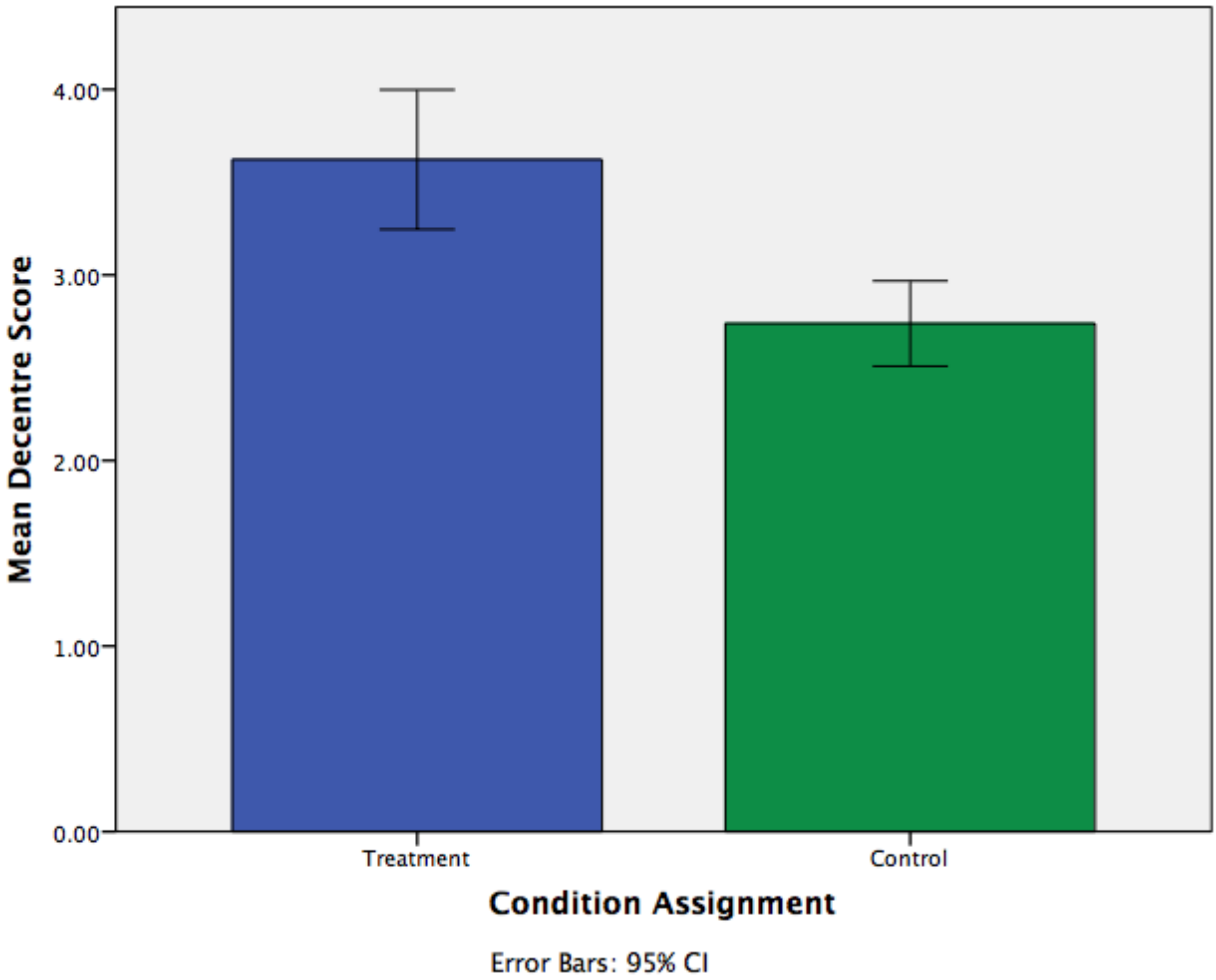


Figure 5. Mean score on decentring by condition at T2. Values reported are average values. Higher values reflect higher levels of decentring. Decentring mean difference= .884, $t(42)= 4.387$, $p< .0001$.

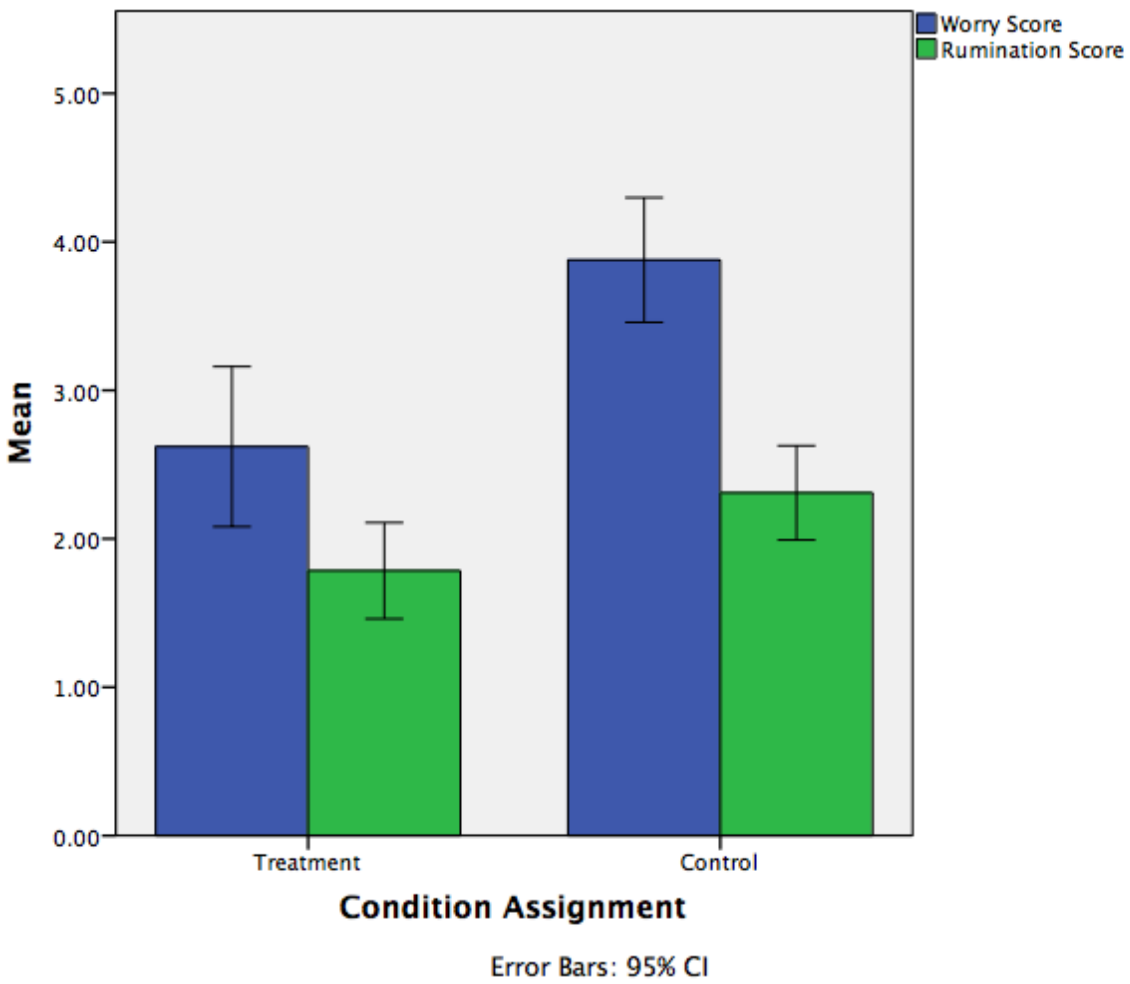


Figure 6. Mean scores on worry and rumination by condition at T2. Values reported are average values. Lower values reflect lower levels of worry and rumination respectively. Worry mean difference= -1.15, $t(37)= - 3.810$, $p< .001$; Rumination mean difference= -.477, $t(38)= -2.345$, $p< .05$.

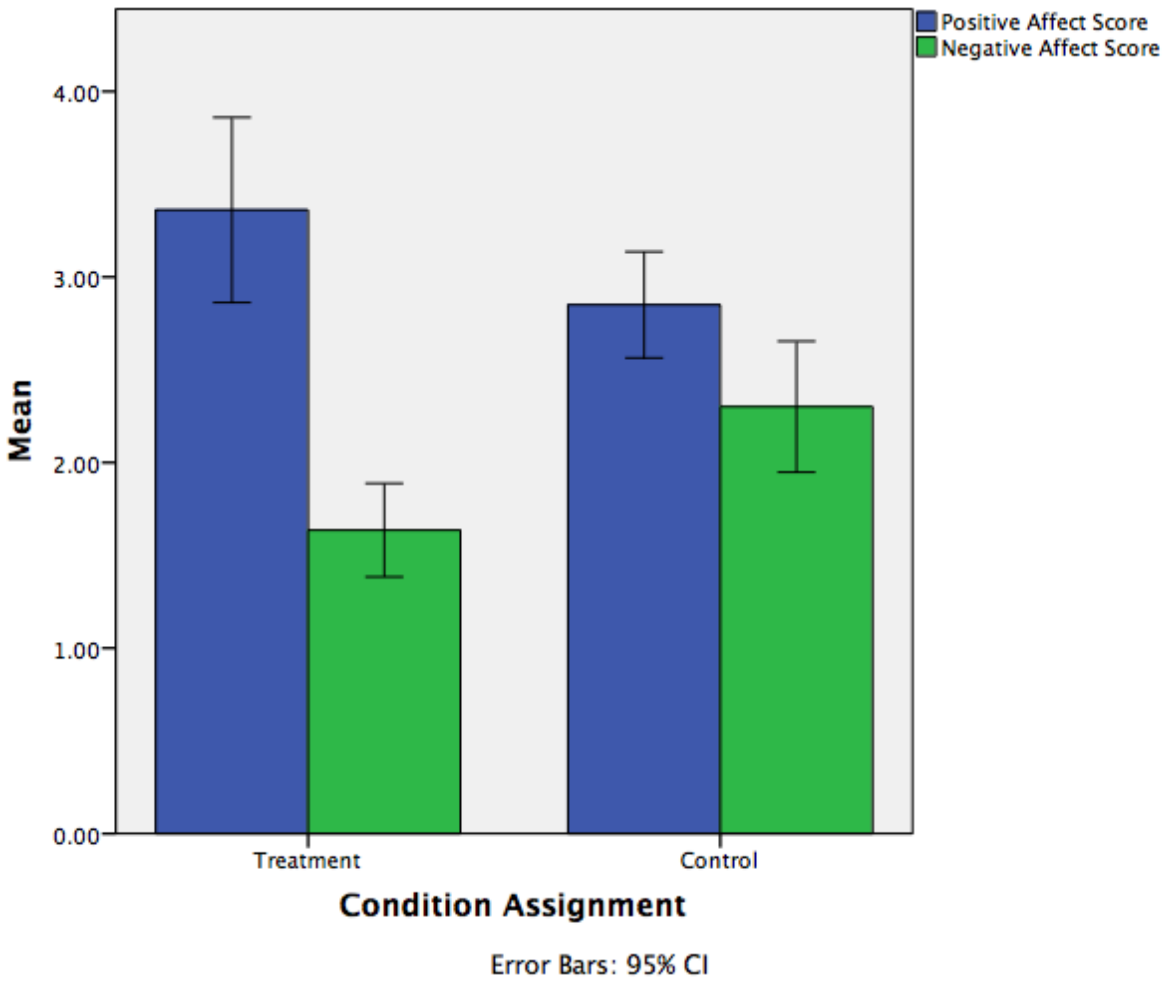


Figure 7. Mean scores on positive and negative affect by condition at T2. Values reported are average values. Higher values of positive affect reflect higher levels of positive affect, while lower values of negative affect reflect lower levels of negative affect. Positive Affect mean difference= .511, $t(40)= 1.971$, $p= .056$; Negative Affect, mean difference= -.658, $t(41)= -3.033$, $p< .05$.

Table 1

Average T1 and T2 pre- and post-intervention values

Pre- and Post-Intervention Measures	Treatment						Control					
	Time 1			Time 2			Time 1			Time 2		
	n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Negative Affect												
PANAS-X NA	19	2.04	.51	19	1.64	.49	25	2.36	.63	24	2.30	.84
Positive Affect												
PANAS-X PA	19	2.81	.64	18	3.36	1.00	25	2.96	.52	24	2.85	.68
Rumination												
RRS	19	2.27	.51	17	1.79	.55	24	2.52	.54	23	2.27	.69
Worry												
PSQW	19	3.49	.90	17	2.74	.98	25	3.76	.73	22	3.89	.90
Self-Compassion												
SCS-SF	19	2.38	.44	19	2.96	.79	25	2.28	.72	24	2.37	.77
Mindfulness												
FFMQ Total	19	2.94	.43	16	3.53	.62	23	2.93	.46	24	2.84	.45
FFMQ Observe	19	3.20	.59	19	3.74	.82	25	3.29	.68	25	3.23	.76
FFMQ Describe	19	3.06	.78	18	3.34	.96	24	2.94	1.00	24	2.89	1.07
FFMQ Awareness	19	2.84	.51	18	3.24	.87	24	2.90	.56	25	2.72	.73
FFMQ Non-judgment	19	2.82	.82	19	3.74	1.00	25	2.95	.88	25	2.90	1.04
FFMQ Non-react	19	2.80	.66	18	3.41	.78	25	2.59	.62	24	2.48	.72
Decentring												
EQ	19	2.93	.65	19	3.62	.78	25	2.73	.58	25	2.74	.56
Depression, Anxiety, and Stress												
DASS Depression	19	.89	.82	17	.30	.39	24	.91	.70	23	1.02	.73
DASS Anxiety	19	.75	.74	17	.32	.46	24	1.04	.73	24	.96	.73
DASS Stress	19	1.12	.80	19	.53	.57	23	1.38	.67	25	1.30	.77
LKM Total Time	-	-	-	38	307.71	274.92	-	-	-	-	-	-

Note. The variation in sample size is due to participants not fully answering questions on the respective pre- and post-intervention measure.

Table 2

T1 and T2 pre- and post-intervention raw scores

Pre- and Post-Intervention	**Treatment**						**Control**					
	Time 1			**Time 2**			**Time 1**			**Time 2**		
Measures	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Negative Affect												
PANAS-X NA	19	18.32	4.56	19	14.79	4.44	25	21.28	5.65	24	20.71	7.52
Positive Affect												
PANAS-X PA	19	28.05	6.44	18	33.61	10.03	25	29.60	5.22	24	28.50	6.78
Rumination												
RRS	19	50.11	11.15	17	39.41	12.15	24	55.46	11.90	23	49.91	15.20
Worry												
PSQW	19	55.89	14.45	17	43.82	15.62	25	60.20	11.68	22	62.23	14.43
Self-Compassion												
SCS-SF	19	28.53	5.24	19	35.53	9.45	25	27.36	8.62	24	28.42	9.21
Mindfulness												
FFMQ Total	19	114.84	16.84	16	137.69	24.29	23	114.35	17.88	24	111.04	17.53
FFMQ Observe	19	25.58	4.68	19	29.95	6.57	25	26.32	5.42	25	25.80	6.09
FFMQ Describe	19	24.47	6.21	18	26.72	7.68	24	23.50	8.04	24	23.13	8.58
FFMQ Awareness	19	22.68	4.11	18	25.94	6.99	24	23.17	4.46	25	21.80	5.80
FFMQ Non-judge	19	22.53	6.54	19	29.89	7.96	25	23.56	7.05	25	23.16	8.35
FFMQ Non-react	19	19.58	4.61	18	23.89	5.44	25	18.12	4.31	24	17.38	5.03
Decentring												
EQ	19	32.21	7.14	19	39.84	8.58	25	30.08	6.36	25	30.12	6.13
Depression, Anxiety, and Stress												
DASS Depression	19	12.47	11.50	17	4.23	5.45	24	12.75	9.81	23	14.35	10.16
DASS Anxiety	19	10.47	10.37	17	4.41	6.50	24	14.50	10.26	24	13.38	10.17
DASS Stress	19	15.68	11.25	19	7.37	7.97	23	19.30	9.41	25	18.16	10.82
LKM Total Time	-	-	-	38	307.71	274.92	-	-	-	-	-	-

Note. The variation in sample size is due to participants not fully answering questions on the respective pre- and post-intervention measure.

Table 3

Pre-intervention t-test results

Pre-Intervention Measures	Treatment			Control				
	Time 1			Time 1				
	n	*M*	*SE*	*n*	*M*	*SE*	*t*	*p*
Negative Affect								
PANAS-X NA	19	2.04	.12	25	2.36	.13	-1.868	.069
Positive Affect								
PANAS-X PA	19	2.81	.15	25	2.96	.10	-.880	.384
Rumination								
RRS	19	2.27	.12	24	2.52	.11	-1.506	.140
Worry								
PSQW	19	3.49	.21	25	3.76	.15	-1.093	.281
Self-Compassion								
SCS-SF	19	2.38	.10	25	2.28	.14	.520	.606
Mindfulness								
FFMQ Total	19	2.94	.10	23	2.93	.10	.092	.928
FFMQ Observe	19	3.20	.13	25	3.29	.14	-.476	.637
FFMQ Describe	19	3.06	.18	24	2.94	.21	.435	.666
FFMQ Awareness	19	2.84	.12	24	2.90	.11	-.365	.717
FFMQ Non-judgment	19	2.82	.19	25	2.95	.18	-.497	.622
FFMQ Non-react	19	2.80	.15	25	2.59	.12	1.079	.287
Decentring								
EQ	19	2.93	.15	25	2.73	.12	1.044	.302
Depression, Anxiety, and Stress								
DASS Depression	19	.89	.18	24	.91	.14	-.085	.933
DASS Anxiety	19	.75	.17	24	1.04	.15	-1.272	.211
DASS Stress	19	1.12	.18	23	1.38	.14	-1.136	.263

Note. Values reported are based on the average scores.

Table 4

Summary of Inter-correlations Between Pre-Intervention Measures at T1

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. PANAS-X NA	—	-.338[a]	.418[a]	.309[a]	-.447[a]	-.235[b]	-.241[b]	-.258[b]	-.499[a]	-.392[a]	-.401[a]	.557[a]	.577[a]	.583[a]
		n=81	*n*=79	*n*=81	*n*=81	*n*=81	*n*=77	*n*=79	*n*=80	*n*=80	*n*=81	*n*=79	*n*=80	*n*=78
2. PANAS-X PA	-.338[a]	—	-.280[b]	-.253[b]	.320[a]	.430[a]	.486[a]	.412[a]	.315[a]	.407[a]	.423[a]	-.554[a]	-.280[b]	-.278[b]
	n=81		*n*=79	*n*=81	*n*=81	*n*=81	*n*=77	*n*=79	*n*=80	*n*=80	*n*=81	*n*=79	*n*=80	*n*=78
3. RRS	.418[a]	-.280[b]	—	.479[a]	-.418[a]	-.144	-.182	-.310[a]	-.478[a]	-.407[a]	-.413[a]	.517[a]	.392[a]	.466[a]
	n=79	*n*=79		*n*=79	*n*=79	*n*=79	*n*=75	*n*=77	*n*=78	*n*=78	*n*=79	*n*=77	*n*=78	*n*=78
4. PSWQ	.309[a]	-.253[b]	.479[a]	—	-.561[a]	-.143	-.167	-.275[b]	-.399[a]	-.460[a]	-.535[a]	.481[a]	.594[a]	.600[a]
	n=81	*n*=81	*n*=79		*n*=81	*n*=81	*n*=77	*n*=79	*n*=80	*n*=80	*n*=81	*n*=79	*n*=80	*n*=78
5. SCS-SF	-.447[a]	.320[a]	-.418[a]	-.561[a]	—	.396[a]	.236[b]	.232[b]	.606[a]	.596[a]	.627[a]	-.641[a]	-.431[a]	-.506[a]
	n=81	*n*=81	*n*=79			*n*=81	*n*=77	*n*=79	*n*=80	*n*=80	*n*=81	*n*=79	*n*=80	*n*=78
6. FFMQ Observe	-.235[b]	.430[a]	-.144	-.143	.396[a]	—	.332[a]	.182	.183	.465[a]	.507[a]	-.434[a]	-.079	-.205
	n=81	*n*=81	*n*=79	*n*=81	*n*=81		*n*=77	*n*=79	*n*=80	*n*=80	*n*=81	*n*=79	*n*=80	*n*=78
7. FFMQ Describe	-.241[b]	.486[a]	-.182	-.167	.236[b]	.332[a]	—	.383[a]	.263[b]	.325[a]	.368[a]	-.387[a]	-.262[b]	-.272[b]
	n=77	*n*=77	*n*=75	*n*=77	*n*=77	*n*=77		*n*=76	*n*=77	*n*=76	*n*=77	*n*=77	*n*=76	*n*=75
8. FFMQ Awareness	-.258[b]	.412[a]	-.310[a]	-.275[b]	.232[b]	.182	.383[a]	—	.302[a]	.093	.370[a]	-.394[a]	-.176	-.300[a]
	n=79	*n*=79	*n*=77	*n*=79	*n*=79	*n*=79	*n*=76		*n*=79	*n*=78	*n*=77	*n*=77	*n*=78	*n*=76
9. FFMQ Non-judgment	-.499[a]	.315[a]	-.478[a]	-.399[a]	.606[a]	.183	.263[b]	.302[a]	—	.401[a]	.479[a]	-.599[a]	-.446[a]	-.461[a]
	n=80	*n*=80	*n*=78	*n*=80	*n*=80	*n*=80	*n*=77	*n*=79		*n*=79	*n*=80	*n*=78	*n*=79	*n*=77
10. FFMQ Non-react	-.392[a]	.407[a]	-.407[a]	-.460[a]	.596[a]	.465[a]	.325[a]	.093	.401[a]	—	.724[a]	-.490[a]	-.339[a]	-.472[a]
	n=80	*n*=80	*n*=78	*n*=80	*n*=80	*n*=80	*n*=76	*n*=78	*n*=80		*n*=80	*n*=78	*n*=79	*n*=77
11. EQ	-.401[a]	.423[a]	-.413[a]	-.535[a]	.627[a]	.507[a]	.368[a]	.370[a]	.479[a]	.724[a]	—	-.556[a]	-.439[a]	-.526[a]
	n=81	*n*=81	*n*=79	*n*=81	*n*=81	*n*=81	*n*=77	*n*=79	*n*=80	*n*=80		*n*=79	*n*=80	*n*=78
12. DASS Depression	.557[a]	-.554[a]	.517[a]	.481[a]	-.641[a]	-.434[a]	-.387[a]	-.394[a]	-.599[a]	-.490[a]	-.556[a]	—	.606[a]	.738[a]
	n=79	*n*=79	*n*=77	*n*=79	*n*=79	*n*=79	*n*=77	*n*=77	*n*=78	*n*=78	*n*=79		*n*=78	*n*=77
13. DASS Anxiety	.577[a]	-.280[b]	.392[a]	.594[a]	-.431[a]	-.079	-.262[b]	-.176	-.446[a]	-.339[a]	-.439[a]	.606[a]	—	.795[a]
	n=79	*n*=80	*n*=78	*n*=80	*n*=80	*n*=80	*n*=76	*n*=78	*n*=79	*n*=79	*n*=80	*n*=78		*n*=77
14. DASS Stress	.583[a]	-.278[b]	.466[a]	.600[a]	-.506[a]	-.205	-.272[b]	-.300[a]	-.461[a]	-.472[a]	-.526[a]	.738[a]	.795[a]	—
	n=78	*n*=78	*n*=78	*n*=78	*n*=78	*n*=78	*n*=75	*n*=76	*n*=77	*n*=77	*n*=78	*n*=77	*n*=77	

Note. Correlations with a superscript *a* are significant at the 0.01 level (2-tailed). Correlations with a superscript *b* are significant at a 0.05 level (2-tailed). Based on average values.

Table 5

Summary of Inter-correlations Between Post-Intervention Measures at T2

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. PANAS-X NA	—	-.415[a]	.700[a]	.657[a]	-.725[a]	-.180	-.229	-.485[a]	-.586[a]	-.531[a]	-.585[a]	.831[a]	.851[a]	.843[a]
		n=42	*n*=40	*n*=39	*n*=42	*n*=43	*n*=42	*n*=42	*n*=43	*n*=42	*n*=43	*n*=39	*n*=40	*n*=43
2. PANAS-X PA	-.415[a]	—	-.256	-.498[a]	.535[a]	.506[a]	.375[b]	.642[a]	.192	.516[a]	.670[a]	-.584[a]	-.544[a]	-.457[a]
	n=42		*n*=39	*n*=38	*n*=41	*n*=42	*n*=41	*n*=41	*n*=42	*n*=41	*n*=42	*n*=38	*n*=39	*n*=42
3. RRS	.700[a]	-.256	—	.535[a]	-.544[a]	.060	-.103	-.356[b]	-.565[a]	-.394[b]	-.338[b]	.607[a]	.510[a]	.583[a]
	n=40	*n*=39		*n*=36	*n*=40	*n*=40	*n*=39	*n*=39	*n*=40	*n*=39	*n*=40	*n*=37	*n*=37	*n*=40
4. PSWQ	.657[a]	-.498[a]	.535[a]	—	-.730[a]	-.332[b]	-.346[b]	-.427[a]	-.486[a]	-.718[a]	-.686[a]	.580[a]	.628[a]	.718[a]
	n=39	*n*=38	*n*=36		*n*=38	*n*=39	*n*=39	*n*=39	*n*=39	*n*=38	*n*=39	*n*=36	*n*=36	*n*=39
5. SCS-SF	-.725[a]	.535[a]	-.544[a]	-.730[a]	—	.461[a]	.190	.453[a]	.566[a]	.762[a]	.792[a]	-.642[a]	-.568[a]	-.646[a]
	n=42	*n*=41	*n*=40	*n*=38		*n*=43	*n*=41	*n*=42	*n*=43	*n*=41	*n*=43	*n*=39	*n*=40	*n*=43
6. FFMQ Observe	-.180	.506[a]	.060	-.332[b]	.461[a]	—	.278	.218	.143	.650[a]	.717[a]	-.288	-.141	-.197
	n=43	*n*=42	*n*=40	*n*=39	*n*=43		*n*=42	*n*=43	*n*=44	*n*=42	*n*=44	*n*=40	*n*=41	*n*=44
7. FFMQ Describe	-.229	.375[b]	-.103	-.346[b]	.190	.278	—	.335[b]	.164	.252	.387[b]	-.216	-.205	-.222
	n=42	*n*=41	*n*=39	*n*=39	*n*=41	*n*=42		*n*=41	*n*=42	*n*=41	*n*=77	*n*=38	*n*=39	*n*=42
8. FFMQ Awareness	-.485[a]	.642[a]	-.356[b]	-.427[a]	.453[a]	.218	.335[b]	—	.266	.309[b]	.466[a]	-.588[a]	-.530	-.513[a]
	n=42	*n*=41	*n*=39	*n*=39	*n*=42	*n*=43	*n*=41		*n*=43	*n*=41	*n*=43	*n*=39	*n*=40	*n*=43
9. FFMQ Non-judgment	-.586[a]	.192	-.565[a]	-.486[a]	.566[a]	.143	.164	.266	—	.454[a]	.430[a]	-.513[a]	-.480[a]	-.619[a]
	n=43	*n*=42	*n*=40	*n*=39	*n*=43	*n*=44	*n*=42	*n*=43		*n*=42	*n*=44	*n*=40	*n*=41	*n*=44
10. FFMQ Non-react	-.531[a]	.516[a]	-.394[b]	-.718[a]	.762[a]	.650[a]	.252	.309[b]	.454[a]	—	.838[a]	-.456[a]	-.523[a]	-.560[a]
	n=42	*n*=41	*n*=39	*n*=39	*n*=41	*n*=42	*n*=41	*n*=41	*n*=42		*n*=42	*n*=38	*n*=39	*n*=42
11. EQ	-.585[a]	.670[a]	-.338[b]	-.686[a]	.792[a]	.717[a]	.387[b]	.466[a]	.430[a]	.838[a]	—	-.561[a]	-.574[a]	-.590[a]
	n=43	*n*=42	*n*=40	*n*=39	*n*=43	*n*=44	*n*=42	*n*=43	*n*=44	*n*=42		*n*=40	*n*=41	*n*=44
12. DASS Depression	.831[a]	-.584[a]	.607[a]	.580[a]	-.642[a]	-.288	-.216	-.588[a]	-.513[a]	-.456[a]	-.561[a]	—	.825[a]	.851[a]
	n=39	*n*=38	*n*=37	*n*=36	*n*=39	*n*=40	*n*=38	*n*=39	*n*=40	*n*=38	*n*=40		*n*=38	*n*=40
13. DASS Anxiety	.851[a]	-.544[a]	.510[a]	.628[a]	-.568[a]	-.141	-.205	-.530[a]	-.480[a]	-.523[a]	-.574[a]	.825[a]	—	.883[a]
	n=40	*n*=39	*n*=37	*n*=36	*n*=40	*n*=41	*n*=39	*n*=40	*n*=41	*n*=39	*n*=41	*n*=38		*n*=41
14. DASS Stress	.843[a]	-.457[a]	.583[a]	.718[a]	-.646[a]	-.197	-.222	-.513[a]	-.619[a]	-.560[a]	-.590[a]	.851[a]	.883[a]	—
	n=43	*n*=42	*n*=40	*n*=39	*n*=43	*n*=44	*n*=42	*n*=43	*n*=44	*n*=42	*n*=44	*n*=40	*n*=41	

Note. Correlations with an *a* are significant at or below the 0.01 level (2-tailed), *b* are significant at or below the 0.05 level (2-tailed).

Based on average values.

Appendix B: Intervention Materials

Hello everyone and thank you for coming to this initial training session for my honours research project and for filling out the consent forms and initial surveys. I am going to give a brief introduction to mindfulness and the meditation you will be practicing in this study.

Before I discuss mindfulness, it is very important to have a general idea for how Buddhist philosophy thinks we construct our experience. Now I am not saying that this is how our experience is created nor am I saying it is necessarily the right way of viewing how we construct our reality, but because this is where mindfulness derives from it is important to at least appreciate the thought that influenced the practice.

So within Buddhist philosophy all experience involves a process whereby raw data streams into the mind through 'sense doors', or sense organs. The sense organs align, more or less, with contemporary notions of the human sensory system: the eyes, ears, nose, tongue, body, and mind. Once the raw data enters a sense organ it is then processed by the five primary categories/systems thought to be involved in constructing our experience (in order): material form, consciousness, perception, feeling, and formation. The first four systems yield a sense of what is happening, while the fifth decides what we are going to do.

The first category, material form, acknowledges that the mind and body have a material, biological foundation. Next, consciousness entails the act of becoming aware of an object—sense impression or cognition—by one of the sense organs; and as you may remember from my recruitment presentation, we can only be aware of one object at a time and that there is no discernible difference between a sensory impression or cognition—they are treated as the same transient mental event. The third system, perception, identifies what is experienced through a series of learned associations based on prior experiences. Fourth, feeling provides an

instantaneous emotional tone to each moment of awareness as pleasant, unpleasant, or neutral. Finally, formations reflect the things we do that initiate and guide our conscious or unconscious choices to seek pleasant feelings and avoid unpleasant ones.

Of course this is an unfolding process, so what would this look like? As an example, imagine you are studying a textbook for a final exam. Your eyes see black lines against a white background in their visual field, which is quickly organized by the brain and perceived as words on a page. At the same time you develop a negative emotional tone (i.e., unpleasant feeling) toward the textbook, and the intention forms to give up studying and take a break. In an attempt to avoid this unpleasant feeling you take a break and watch an episode of a television show you enjoy. Over time, these intentions and behaviours turn into dispositions: or, the learned behaviours people use to either prolong a pleasant feeling or end an unpleasant feeling. This means the dispositions we form influence future responses to our experiences. Meaning in the future we may be more likely to take a break from studying to avoid the initial unpleasant sensation we experienced. But by becoming aware of this entire process through cultivating mindfulness, through mindfulness meditation, we can learn that the initial sensation is not permanent and can react accordingly.

Therefore within Buddhist philosophy arising from these complex processes are three key concepts: impermanence, suffering, and not-self. Impermanence simply means that nothings stays the same or is constant, things are always changing. For instance, when practicing mediation you may notice that each successive breath is slightly different than the last. Suffering means the effort we exert in trying to prolong pleasant states and end unpleasant states, rather than simply being we are creating needless suffering by trying to prolong or end something that is temporary by nature. For example, when mediating you may notice that you prefer one style of

breathing to another (e.g., slow and smooth, to fast and rough), and thus notice attachment to that style, and perhaps become aware of efforts to change the breath to be of the preferred type. Finally, not-self is reflective of the idea that there is no separate entity arising from the sense impressions or cognitions. For example, when meditating you may notice your breathing continues without your own effort or control. If you look at the image in the handout you will see a diagram that neatly summarizes this. As you can see then on slide 2, Transience is reflected in point 1, mental event A arises and passes away and mental even B arises and passes away. Suffering is reflected in point 2 where it shows the habitual attachment we have developed to these mental events leads to suffering. Finally, point 3 reflects the idea that mental event A and mental event B are not actually aspects of the self, but just mental events.

Now let's take a look at meditation.

First, there are generally two types of meditations: concentrative meditations and mindfulness meditations. I will first explain what concentrative meditations are to give a good contrast for mindfulness meditations. In concentrative meditation a person will voluntarily focus their attention on a particular object or sensation and sustain attention on whatever that object or sensation is. For example, focused breathing is a type of concentrative meditation in which the meditator directs their attention to their breath cycle and focuses solely on the breathing while trying to block out all other distractions. This is typically how people think of meditation.

However, in mindfulness meditation the meditator is directing their attention to their moment-to-moment experience with an orientation of curiosity, openness, and acceptance. When I say curiosity it is important to remember this means: curiosity about where the mind wanders whenever it drifts away from your breathing/object of focus, or about the different objects within your experience at any moment. When I say acceptance I mean: allowing current thoughts,

feelings, and sensations to occur and not trying to avoid them. What I mean by openness is: just trying to be open to the reality of the present moment and not avoiding any aspect of your experience. So this means you should make an effort to notice each object in the stream of consciousness (e.g., a feeling or thought), to discriminate between different elements of experience (e.g., an emotional "feeling" sensation from a physical "touch" sensation) and observe how one experience gives rise to another (e.g., a feeling evoking a judgmental thought and then the judgmental thought heightening the unpleasant feeling). However, in mindfulness meditation if you notice that you are becoming overwhelmed or attached to a certain line of thought, you refocus your attention on your breathing (just like in concentrative meditation) and you focus on your breathing until you are ready to start expanding your awareness back towards all aspects of your experience. For example, if a meditator notices their mind becoming attached to a certain train of thought, they can re-focus their attention on the breathing and detach from that line of thinking, then start expanding their awareness back to all aspects of experience.

So as an example of what a typical mindfulness meditation practice may look like, a meditator will focus on their breathing and pay attention to the sensations it causes in the body, they notice the sensation of the air moving through their nose and the rise and fall of their chest, they may then notice a slight pain in their knee from the sitting position they are in. The meditator may then direct their attention to that pain an explore the sensation with curiosity noticing how the initial physical pain sensation is accompanied by an emotional sensation of "this is making me *feel* uncomfortable and I want to change positions," the meditator may then notice how this leads to another thought "why am I doing this if it makes me uncomfortable, I am a stupid person from trying this," the meditator may then notice that this judgmental thought from the initial pain sensation has actually made them feel worse. This is all to say that in

mindfulness meditation you are essentially trying to recognize the subjective and transient nature of your own thoughts and emotions. From the example this would mean that the thought "I am a stupid person for trying this" is subjective and not an inherent reflection of the self or necessarily an accurate representation of reality.

Often contained within the mindfulness meditation umbrella is the type of mediation known as loving-kindness meditation. This meditation has all the same aspects of mindfulness meditation except it helps to cultivate the intention to be loving and kind to the self and all sentient beings. This type of meditation is what you will be practicing in my study and I will introduce you to the recording you will be practicing shortly.

But before I introduce you to that meditation, I would like to point out the importance of the breath in mindfulness meditation. One reason for the focus on the breath is because for most people the breath produces neutral feelings. As such it may help the meditator learn a new way to relate to their experiences; that is it may help develop insight into the subject, transient nature of their thoughts and feelings. This concept is perhaps the most central part of why mindfulness is believed to actually work and is accepted by both Buddhist and Western researchers. So let me reiterate, mindfulness meditation may produce its positive benefits by helping you recognize that thoughts and feelings are passing events in the mind rather than as inherent aspects of the self or valid reflections of reality. As such it may help you change the relationship you have to your thoughts and emotions allowing you to regulate how you feel through the re-focusing of attention. In other words, it is meant to help you break old, unhelpful, automatic ways of thinking and responding.

As you can see then, the take home point here is that mindfulness is about regulating your attention to the present moment in a particular way, one characterized by curiosity, openness,

and acceptance. And we all possess this capability to regulate our attention, in fact we do so when we are attending class, however we may not be approaching that experience with the same orientation. However, with mindfulness it is an active process that can be employed outside the formal meditation practice as long as you are approaching your experience with the particular orientation I have described. Where mindfulness meditation comes into play then is that it helps develops a person's mindfulness. Therefore, two basic goals of mindfulness meditation are to 1) increase levels of mindfulness and 2) develop the insight that our thoughts and emotions are passing events in the mind rather than inherent aspects of the self or necessarily a valid reflection of reality.

So let's now listen to the loving-kindness meditation I will have you practice for the duration of this study. For this initial session try to just get an understanding of what you will be asked to do and if you have any questions about this meditation I will answer them at the end of the session.

[Meditation Played, 25 minutes]

So as you can see loving kindness meditation is about cultivating the intention to be loving and kind to the self and all sentient beings. You will also notice that you start off with practicing breath awareness to act as an anchor for when your mind wanders or becomes attached to a certain line of thought. When this happens you just gently bring your attention back to the breath or object of focus and note the divergence. Again, this is all done to help you generate insight into the transient nature of mental events and facilitate a sense of non-

attachment to those events, while at the same time helping to cultivate the intention to be loving and kind.

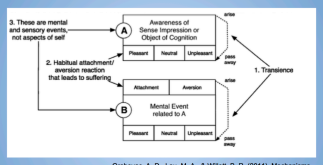
Also, just to clarify you don't have to constantly repeat the phrases, rather you say the phrase and notice how you react, notice what it evokes in the body, does your breathing change? Do you allow yourself to truly accept the intentions you are trying to cultivate? Then you say the next phrase and repeat the same process of introspection, just noticing how you react in the ever-changing moment-to-moment experience.

Again, the main point here is to notice how our thoughts and emotions influence us and by re-directing our attention when we become attached to a certain train of thought we can start to regulate how we feel and respond to those thoughts and emotions when they do come up. To be clear, as it mentions on the mindfulness handout, this is done to help you develop a new habit to help weaken old, unhelpful and automatic ways of thinking and responding.

15-01-26

How we construct our experience

- Material Form
  - Mind and Body have biological origins
- Consciousness
  - Awareness of sense impression or thought
- Perception
- Feeling
- Formation
  - What we do



Grabovac, A. D., Lau, M. A., & Willett, B. R. (2011). Mechanisms of mindfulness: A Buddhist psychological model. *Mindfulness*, 2(3), 154-166. doi:10.1007/s12671-011-0054-5

Concentrative, Mindfulness, Loving-Kindness Meditations

- Concentrative meditation: voluntarily focus attention on a particular object or sensation and sustain attention on whatever that object or sensation is.
- Mindfulness meditation: directing attention to moment-to-moment experience with an orientation of curiosity, openness, and acceptance.
- LKM: same aspects of mindfulness meditation except it helps to cultivate the intention to be loving and kind to the self and all sentient beings.

What is Mindfulness?

- Kabat-Zinn (2003): "the awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment" (pg. 145).
- Bishop et al. (2004):the self-regulation of attention so that is maintained on immediate experience, thereby allowing for increased recognition of mental events in the present moment; facilitated by the adoption of an orientation to experience in the present moment that is characterized by curiosity, openness, and acceptance.

What is Mindfulness?

- Common theme: attention regulation with a particular orientation to moment-to-moment experience
- Goal: Cultivate awareness that our thoughts and emotions are transient and not an inherent reflection of the self or necessarily and accurate reflection of reality

Core Features of Mindfulness

- Observing all aspects of experience
- Openness to all aspects of experience
- Being non-judgemental and accepting
- Describing internal/external experiences
- Present-centred, or focusing on one thing at a time

what is mindfulness?

Have you ever noticed that when you are doing quite familiar and repetitive tasks, like driving your car, or vacuuming, that you mind is often miles away thinking about something else? You may be fantasising about going on a vacation, worrying about some upcoming event, or thinking about any number of other things.

In either case you are not focusing on your current experience, and you are not really in touch with the 'here and now.' This way of operating is often referred to as ***automatic pilot*** mode.

Mindfulness is the opposite of automatic pilot mode. It is about experiencing the world that is firmly in the 'here and now.' This mode is referred to as the ***being*** mode. It offers a way of freeing oneself from automatic and unhelpful ways of thinking and responding.

Benefits of Mindfulness

By learning to be in mindful mode more often, it is possible to develop a new habit that helps to weaken old, unhelpful and automatic thinking habits. For people with emotional problems, these old habits can involve being overly pre-occupied with thinking about the future, the past, themselves, or their emotions in a negative way. Mindfulness training in this case does not aim to immediately control, remove, or fix this unpleasant experience. Rather, it aims to develop a skill to place you in a better position to break free of or not 'buy into' these unhelpful habits that are causing distress and preventing positive action.

Core Features of Mindfulness

Observing

The first major element of mindfulness involves observing your experience in a manner that is more direct and sensual (**sensing mode**), rather than being analytical (**thinking mode**). A natural tendency of the mind is to try and think about something rather than directly experience it. Mindfulness thus aims to shift one's focus of attention away from thinking to simply observing thoughts, feelings, and bodily sensations (e.g., touch, sight, sound, smell, taste) with a kind and gentle curiosity.

Describing

This aspect of mindfulness relates to noticing the very fine details of what you are observing. For example, if you are observing something like a tangerine, the aim is to describe what it looks like, what is its shape, colour, and texture. You might place a descriptive name to it, like "orange", "smooth", or "round". The same process also can be applied to emotions (e.g. "heavy", "tense").

Participating Fully

An aim of mindfulness is to allow yourself to consider the whole of your experience, without excluding anything. Try to notice all aspects of whatever task or activity you are doing, and do it with your full care and attention.

Being Non-Judgemental

It is important to adopt an accepting stance towards your experience. A significant reason for prolonged emotional distress relates to attempts to avoid or control your experience. When being more mindful, no attempt is made to evaluate experiences or to say that they are good, bad, right, or wrong, and no attempt is made to immediately control or avoid the experience. Accepting all of one's experience is one of the most challenging aspects of mindfulness, and takes time and practice to develop. Bringing a kind and gentle curiosity to one's experience is one way of adopting a non-judgmental stance.

Focusing on One Thing at a Time

When observing your own experience, a certain level of effort is required to focus your attention on only one thing at a time, from moment to moment. It is natural for distracting thoughts to emerge while observing, and there is a tendency to follow and 'chase' these thoughts with more thinking. The art of 'being present' is to develop the skill of noticing when you have drifted away from the observing and sensing mode, into thinking mode. When this happens it is not a mistake, but just acknowledge it has happened, and then gently return to observing your experience.

How to Become Mindful

Mindfulness is a skill that takes time to develop. It is not easy, and like any skill it requires a certain level of effort, time, patience, and ongoing practice. Mindfulness can be taught in a number of ways. Meditation is one of the key techniques used in mindfulness training, but not the only technique. Contact your mental health professional for further information on mindfulness training and whether it may be suited to your needs.

Centre for Clinical Interventions
• Psychotherapy • Research • Training

Centre of Clinical Interventions. (2014). "What Is Mindfulness?" *Centre of Clinical Interventions*. Last accessed April 13th, 2015. http://www.cci.health.wa.gov.au/docs/ACF3C5B.pdf

Appendix C: Pre- and Post-Intervention Survey

Unique ID:

Age:

Gender:

Year of study:
☐ First Year
☐ Second Year
☐ Third Year
☐ Fourth Year
☐ Fifth Year
☐ Other:

Faculty:
☐ Science
☐ Arts
☐ Business
☐ Nursing
☐ Education
☐ Veterinary Medicine
☐ Other:

Have you ever received formal training in mindfulness (e.g., taken a mindfulness-based stress reduction course, received mindfulness-based cognitive therapy, etc.)?
☐ Yes
☐ No

Have you ever meditated before (including both mindfulness and concentrative forms of meditation)?
☐ Yes
☐ No

If yes, how many hours do you think you have practiced in total?
☐ 0-10 Hours
☐ 10-20 Hours
☐ 20-30 Hours
☐ 30-40 Hours
☐ 50+ Hours

1) Positive and Negative Affect Scale Expanded

This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you have felt this way during the past few weeks. Use the following scale to record your answers:

1 very slightly or not at all	2 a little	3 moderately	4 quite a bit	5 extremely
_____ cheerful	_____ sad	_____ active		_____ angry at self
_____ disgusted	_____ calm	_____ guilty		_____ enthusiastic
_____ attentive	_____ afraid	_____ joyful		_____ downhearted
_____ bashful	_____ tired	_____ nervous		_____ sheepish
_____ sluggish	_____ amazed	_____ lonely		_____ distressed
_____ daring	_____ shaky	_____ sleepy		_____ blameworthy
_____ surprised	_____ happy	_____ excited		_____ determined
_____ strong	_____ timid	_____ hostile		_____ frightened
_____ scornful	_____ alone	_____ proud		_____ astonished
_____ relaxed	_____ alert	_____ jittery		_____ interested
_____ irritable	_____ upset	_____ lively		_____ loathing
_____ delighted	_____ angry	_____ ashamed		_____ confident
_____ inspired	_____ bold	_____ at ease		_____ energetic
_____ fearless	_____ blue	_____ scared		_____ concentrating
_____ disgusted with self	_____ shy	_____ drowsy		_____ dissatisfied with self

2) Rumination Scale

People think and do many different things when they feel depressed. Please read each of the items below and indicate whether you almost never, sometimes, often, or almost always think or do each one when you feel down, sad, or depressed. Please indicate what you *generally* do, not what you think you should do. Use the following scale:

1	2	3	4
Almost never	Sometimes	Often	Almost always

1. Think about how alone you feel. _____
2. Think “I won’t be able to do my job if I don’t snap out of this.” _____
3. Think about your feelings of fatigue and achiness. _____
4. Think about how hard it is to concentrate. _____
5. Think “What am I doing to deserve this?” _____
6. Think about how passive and unmotivated you feel. _____
7. Analyze recent events to try to understand why you are depressed. _____
8. Think about how you don’t seem to feel anything anymore. _____
9. Think “Why can’t I get going?” _____

1	2	3	4
Almost never	Sometimes	Often	Almost always

10. Think "Why do I always react this way?" _____
11. Go away by yourself and think about why you feel this way. _____
12. Write down what you are thinking about and analyze it. _____
13. Think about a recent situation, wishing it had gone better. _____
14. Think "I won't be able to concentrate if I keep feeling this way." _____
15. Think "Why do I have problems other people don't have?" _____
16. Think "Why can't I handle things better?" _____
17. Think about how sad you feel. _____
18. Think about all your shortcomings, failings, faults, mistakes. _____
19. Think about how you don't feel up to doing anything. _____
20. Analyze your personality to try to understand why you are depressed. _____
21. Go someplace alone to think about your feelings. _____
22. Think about how angry you are with yourself. _____

3) The Penn State Worry Questionnaire (PSWQ)

Instructions: Rate each of the following statements on a scale of 1 ("not at all typical of me") to 5 ("very typical of me"). Please do not leave any items blank.

1. If I do not have enough time to do everything, I do not worry about it.

1 2 3 4 5
Not at all typical of me Very typical of me

2. My worries overwhelm me.

1 2 3 4 5
Not at all typical of me Very typical of me

3. I do not tend to worry about things.

1 2 3 4 5
Not at all typical of me Very typical of me

4. Many situations make me worry.

1 2 3 4 5
Not at all typical of me Very typical of me

5. I know I should not worry about things, but I just cannot help it.

1 2 3 4 5
Not at all typical of me Very typical of me

6. When I am under pressure I worry a lot.

1 2 3 4 5
Not at all typical of me Very typical of me

7. I am always worrying about something.

1 2 3 4 5
Not at all typical of me Very typical of me

8. I find it easy to dismiss worrisome thoughts.
1 2 3 4 5
Not at all typical of me Very typical of me

9. As soon as I finish one task, I start to worry about everything else I have to do.
1 2 3 4 5
Not at all typical of me Very typical of me

10. I never worry about anything.
1 2 3 4 5
Not at all typical of me Very typical of me

11. When there is nothing more I can do about a concern, I do not worry about it any more.
1 2 3 4 5
Not at all typical of me Very typical of me

12. I have been a worrier all my life.
1 2 3 4 5
Not at all typical of me Very typical of me

13. I notice that I have been worrying about things.
1 2 3 4 5
Not at all typical of me Very typical of me

14. Once I start worrying, I cannot stop.
1 2 3 4 5
Not at all typical of me Very typical of me

15. I worry all the time.
1 2 3 4 5
Not at all typical of me Very typical of me

16. I worry about projects until they are all done.
1 2 3 4 5
Not at all typical of me Very typical of me

4) Self-Compassion Scale Short-Form

1. When I fail at something important to me I become consumed by feelings of inadequacy.
1 2 3 4 5
Almost never Almost Always

2. I try to be understanding and patient towards those aspects of my personality I don't like.
1 2 3 4 5
Almost never Almost Always

3. When something painful happens I try to take a balanced view of the situation.

1	2	3	4	5
Almost never				Almost Always

4. When I'm feeling down, I tend to feel like most other people are probably happier than 1 2 3 4 5

Almost never				Almost Always

5. I try to see my failings as part of the human condition.

1	2	3	4	5
Almost never				Almost Always

6. When I'm going through a very hard time, I give myself the caring and tenderness I need.

1	2	3	4	5
Almost never				Almost Always

7. When something upsets me I try to keep my emotions in balance.

1	2	3	4	5
Almost never				Almost Always

8. When I fail at something that's important to me, I tend to feel alone in my failure

1	2	3	4	5
Almost never				Almost Always

9. When I'm feeling down I tend to obsess and fixate on everything that's wrong

1	2	3	4	5
Almost never				Almost Always

10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.

1	2	3	4	5
Almost never				Almost Always

11. I'm disapproving and judgmental about my own flaws and inadequacies.

1	2	3	4	5
Almost never				Almost Always

12. I'm intolerant and impatient towards those aspects of my personality I don't like.

1	2	3	4	5
Almost never				Almost Always

5) Five-Factor Mindfulness Questionnaire

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes your own opinion of what is generally true for you.

1	2	3	4	5

Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true

1. When I'm walking, I deliberately notice the sensations of my body moving. _____
2. I'm good at finding words to describe my feelings. _____
3. I criticize myself for having irrational or inappropriate emotions. _____
4. I perceive my feelings and emotions without having to react to them. _____
5. When I do things, my mind wanders off and I'm easily distracted. _____
6. When I take a shower or bath, I stay alert to the sensations of water on my body. _____
7. I can easily put my beliefs, opinions, and expectations into words. _____
8. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted. _____
9. I watch my feelings without getting lost in them. _____
10. I tell myself I shouldn't be feeling the way I'm feeling. _____
11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions. _____
12. It's hard for me to find the words to describe what I'm thinking. _____
13. I am easily distracted. _____
14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way. _____
15. I pay attention to sensations, such as the wind in my hair or sun on my face. _____
16. I have trouble thinking of the right words to express how I feel about things. _____
17. I make judgments about whether my thoughts are good or bad. _____
18. I find it difficult to stay focused on what's happening in the present. _____
19. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it. _____
20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing. _____
21. In difficult situations, I can pause without immediately reacting. _____
22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words. _____
23. It seems I am "running on automatic" without much aware- ness of what I'm doing. _____
24. When I have distressing thoughts or images, I feel calm soon after. _____
25. I tell myself that I shouldn't be thinking the way I'm thinking. _____
26. I notice the smells and aromas of things. _____
27. Even when I'm feeling terribly upset, I can find a way to put it into words. _____
28. I rush through activities without being really attentive to them. _____
29. When I have distressing thoughts or images, I am able just to notice them without reacting. _____
30. I think some of my emotions are bad or inappropriate and I shouldn't feel them. _____
31. I notice visual elements in art or nature, such as colours, shapes, textures, or patterns of light and shadow. _____
32. My natural tendency is to put my experiences into words. _____

1	2	3	4	5
Never or very rarely true	Rarely true	Sometimes true	Often true	Very often or always true

33. When I have distressing thoughts or images, I just notice them and let them go. _____
34. I do jobs or tasks automatically without being aware of what I'm doing. _____
35. When I have distressing thoughts or images, I judge myself as good or bad depending what the thought or image is about. _____
36. I pay attention to how my emotions affect my thoughts and behaviour. _____
37. I can usually describe how I feel at the moment in consider- able detail. _____
38. I find myself doing things without paying attention. _____
39. I disapprove of myself when I have irrational ideas. _____

6) Experiences Questionnaire

We are interested in your recent experiences. Below is a list of things that people sometimes experience. Please write the number in the blank that indicates how much you currently have experiences similar to those described. Please do not spend too long on each item—it is your first response we are interested in. Please be sure to answer every item. Use the following scale:

1	2	3	4	5
Never	Rarely	Occasionally	Frequently	All the time

1. I think about what will happen in the future. _____
2. I remind myself that thoughts aren't facts. _____
3. I am better able to accept myself as I am. _____
4. I notice all sorts of little things and details in the world around me. _____
5. I am kinder to myself when things go wrong. _____
6. I can slow my thinking at times of stress. _____
7. I wonder what kind of person I really am. _____
8. I am not so easily carried away by my thoughts and feelings. _____
9. I notice that I don't take difficulties so personally. _____
10. I can separate myself from my thoughts and feelings. _____
11. I analyze why things turn out the way they do. _____
12. I can take time to respond to difficulties. _____
13. I think over and over again about what others have said about me. _____
14. I can treat myself kindly. _____
15. I can observe unpleasant feelings without being drawn into them. _____
16. I have the sense that I am fully aware of what is going on around me and inside me.
17. I can actually see that I am not my thoughts. _____
18. I am consciously aware of a sense of my body as a whole. _____
19. I think about the ways in which I am different from other people. _____
20. I view things from a wider perspective. _____

7) Depression, Anxiety, and Stress Scale

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0	1	2	3
Did not apply to me at all	Applied to me to some degree, or some of the time	Applied to me a considerable degree, or a good part of the time	Applied to me very much, or most of the time

1. I found myself getting upset by trivial things. 0 1 2 3
2. I was aware of dryness of my mouth. 0 1 2 3
3. I couldn't seem to experience any positive feeling at all. 0 1 2 3
4. I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion). 0 1 2 3
5. I just couldn't seem to get going. 0 1 2 3
6. I tended to over-react to situations. 0 1 2 3
7. I had a feeling of shakiness (e.g., legs going to give away). 0 1 2 3
8. I found it difficult to relax. 0 1 2 3
9. I found myself in situations that made me so anxious I was most relieved when they ended. 0 1 2 3
10. I felt that I had nothing to look forward to. 0 1 2 3
11. I found myself getting upset rather easily. 0 1 2 3
12. I felt that I was using a lot of nervous energy. 0 1 2 3
13. I felt sad and depressed. 0 1 2 3
14. I found myself getting impatient when I was delayed in any way (e.g., lifts, traffic lights, being kept waiting). 0 1 2 3
15. I had a feeling of faintness. 0 1 2 3
16. I felt that I had lost interest in just about everything. 0 1 2 3
17. I felt I wasn't worth much as a person. 0 1 2 3
18. I felt that I was rather touchy. 0 1 2 3
19. I perspired noticeably (e.g., hands sweaty) in the absence of high temperatures or physical exertion. 0 1 2 3
20. I felt scared without any good reason. 0 1 2 3
21. I felt that life wasn't worthwhile. 0 1 2 3
22. I found it hard to wind down. 0 1 2 3
23. I had difficulty in swallowing. 0 1 2 3
24. I couldn't seem to get any enjoyment out of the things I did. 0 1 2 3
25. I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat). 0 1 2 3
26. I felt down-hearted and blue. 0 1 2 3
27. I found that I was very irritable. 0 1 2 3
28. I felt I was close to panic. 0 1 2 3
29. I found it hard to calm down after something upset me. 0 1 2 3
30. I feared that I would be "thrown" by some trivial but unfamiliar task. 0 1 2 3

0	1	2	3
Did not apply to me at all	Applied to me to some degree, or some of the time	Applied to me a considerable degree, or a good part of the time	Applied to me very much, or most of the time

31. I was unable to become enthusiastic about everything. 0 1 2 3
32. I found it difficult to become enthusiastic about anything. 0 1 2 3
33. I was in a state of nervous tension. 0 1 2 3
34. I felt I was pretty worthless. 0 1 2 3
35. I was intolerant of anything that kept me from getting on with what I was doing. 0 1 2 3
36. I felt terrified. 0 1 2 3
37. I could see nothing in the future to be hopeful about. 0 1 2 3
38. I felt that life was meaningless. 0 1 2 3
39. I found myself getting agitated. 0 1 2 3
40. I was worried about situations in which I might panic and make a fool of myself. 0 1 2 3
41. I experience trembling (e.g., in the hands). 0 1 2 3
42. I found it difficult to work the initiative to do things. 0 1 2 3

Appendix D: Participant Information Letter

You have been invited to participate in a research project on mindfulness meditation and mental well-being conducted by Nathan MacIsaac under the supervision of Dr. Nia Phillips in the Department of Psychology at the University of Prince Edward Island. This study is being conducted to fulfil the requirements for a Bachelor of Arts, Honours Psychology degree.

Mindfulness-based training programs have been linked to a variety of positive outcomes such as lowered levels of self-reported anxiety, depression, anger, rumination, and perceived stress. Mindfulness can be defined as, "the awareness of moment-to-moment experience with acceptance of the here-and-now." In general, mindfulness-based training involves three skills: 1) single-field awareness or concentration, 2) open-field awareness or mindfulness per se, and 3) loving-kindness. Your participation will help me as I research the relationship between the mindfulness meditation practiced and the corresponding changes in levels of mindfulness and mental well-being. For this research project you will be practicing a single 25-minute mindfulness meditation at least 3 times a week for the duration of the study. You will also be asked to log in a notebook each session and the duration, if you decide to practice for more than the minimum time please log this as well. At three points (beginning, middle, and end) I will need to schedule a time for when you can complete a series of questionnaires/forms pertaining to my research project, this should only take 30 minutes of your time. If you are asked to act as a control, you will only be required to complete the series of questionnaires/forms at three times throughout the research project.

Participation in this project will require 1 hour of your time per week on your own, plus three 30-mintue in-person sessions over the course of the study. Your participation in the research project will pose no harm to you. Your participation in this research project is entirely voluntary. You may stop your participation in the research project at any time, without penalty or prejudice. All information collected in the course of this project will remain confidential and anonymous, and you will not be able to be identified from any of your responses. Only Nathan MacIsaac and Dr. Nia Phillips will have access to the data resulting from this research project. Furthermore, all data will be stored on encrypted USB drives. All data resulting from the research project will be retained for a period of five years after the completion of the project, after which time it will be destroyed.

For students in PSY 101/102, you will receive one mark towards the online component of your grade in the course. For those participating who are not in PSY 101/102, you will have your name entered in a draw for a $50 cash prize. If you decide to withdraw from the research project at any time, you will not lose the compensation that you have been awarded for participation.

If you have any questions or concerns about this research project, you may consult with Dr. Nia Phillips, Honours Research Supervisor, phone: 902-566-0966, email: nlphillips@upei.ca or Dr. Colleen MacQuarrie, Chair of the Department of Psychology, ph. (902) 566-0617, email: cmacquarrie@upei.ca. For access to the full results of the research project once these are available, please contact Nathan MacIsaac, 902-218-2694, email: ncmacisaac@upei.ca and/or Dr. Nia Phillips, 902-566-0966, email: nlphillips@upei.ca. If you have any questions about the ethical conduct of this study you may contact the UPEI Research Ethics Board at (902) 620-5104 or by email at reb@upei.ca.

This research project has been approved by the Research Ethics Committee of the Department of Psychology, as a subcommittee of the UPEI Research Ethics Board. Any concerns about the ethical aspects of your involvement in this research project may be directed to Dr. Stacey Mackinnon, Chair of the Ethics Committee, Department of Psychology, telephone (902) 566-0402, e-mail: smackinnon@upei.ca

Appendix E: Participant Consent Form

I consent to participating in research on: the relationship between a mindfulness meditation skill practiced and the corresponding change in levels of mindfulness, and certain measures of both executive functions and mental well-being

I understand that my participation involves: practicing a single, prepared mindfulness meditation at least 3 times a week for 25 minutes each time, for 6 weeks. You will also be asked to log in a notebook each session and the duration, if you decide to practice for more than the minimum time please log this as well. At three points (beginning, middle, and end) I will need to schedule a time for when you can complete a series of questionnaires/forms pertaining to my research project which will require 30 minutes of your time. If you are asked to act as a control, you will only be required to complete the series of questionnaires/forms at three times throughout the research project.

I have read and understood the material about this study in the Information Letter, and understand that:

1. My participation in the study is entirely voluntary;
2. I may discontinue my participation at any time without any adverse consequence;
3. My responses will be kept confidential and anonymous, except where the researcher is required by law to report them;
4. Once all data have been submitted and identifiers removed, I will no longer have the opportunity to request that my data be removed from the study;
5. I have the freedom not to answer any question included in the research;
6. I may have a copy of the signed and dated consent form to keep.

This research is being conducted by Nathan MacIsaac for Psych 480/490 Honours Program under the supervision of Dr. Nia Phillips. Any questions or concerns about this study can be directed to Nathan MacIsaac, 902-218-2694, email: ncmacisaac@upei.ca and/or Dr. Nia Phillips, 902-566-0966, email: nlphillips@upei.ca. If you have any questions about the ethical conduct of this study you may contact the UPEI Research Ethics Board at (902) 620-5104 or by email at reb@upei.ca.

This research has been approved by the Research Ethics Committee of the Department of Psychology, as a sub-committee of the UPEI Research Ethics Board. Any concerns regarding your involvement in this study may be directed to Dr. Stacey Mackinnon, Chair of the Research Ethics Committee, Department of Psychology, telephone (902) 566-0402, email: smackinnon@upei.ca.

Student Identification Number: _____

Participant's name (please print):